U.S. Department of the Interior
Bureau of Land Management

Roseburg District Office
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Roseburg, Oregon 97470

July 2001

Middle North Umpqua Watershed Analysis

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BLM/OR/WA/EA-01/025+1792

Middle North Umpqua/Old Fairview Watershed Analysis

5th Field Watershed and 6th Field Subwatershed

HUC #17100303

Roseburg District BLM

Updated as of
July 2001
Version 2.0

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1 OVERVIEW OF MIDDLE NORTH UMPQUA WATERSHED

A. Introduction

This watershed assessment is one of several assessments that have taken place within the Middle North Umpqua 5th Field Watershed. This particular assessment will focus most directly upon the BLM federal portion of the watershed. Other assessments completed thus far which cover portions of the Middle North Umpqua 5th Field Watershed include: the North Umpqua River Analysis, December, 1999 (Joint Forest Service and BLM) and the Middle North Umpqua Watershed Analysis, version 1.0, January, 2001 (North Umpqua Ranger District). In addition as part of the North Umpqua Hydroelectric Project, FERC Project No. 1927, the North Umpqua Cooperative Watershed Analysis was completed by PacifiCorp in March of 1998. This document covers the entire North Umpqua River drainage area from its confluence with Rock Creek to the headwaters.

B. General Description

Size and Location: The Middle North Umpqua 5th Field Watershed drains an area of approximately 123,900 acres (194 square miles) and stretches approximately 27 miles east to west. This 5th field watershed is a combination of frontal and discreet subwatersheds located in the eastern part of Umpqua Valley. The headwaters begin in the lower Cascades east of the city of Glide approximately 33 miles (Figures 1-1, 1-2) and, except for the flows from Steamboat Creek, the watershed mostly consists of 5th order and smaller streams that flow into the mainstem North Umpqua River. The Umpqua River system, which includes the North, South, and lower Umpqua River, encompasses approximately 4,684 square miles that flow 200 miles from the Cascade crest through the Oregon Coast Range to the Pacific Ocean.

Specific Description: Middle North Umpqua consists of the following nine 6th field subwatersheds (from west to east): Old Fairview, Blitzen Facial, Williams Facial, Cougar, Apple Creek Facial, Panther, Calf, Illahee Facial, and Copeland (Figure 1-3 and 1-6, Table 1-1). The Old Fairview subwatershed drains an area slightly larger than 34 square miles and is composed of six smaller (7th field) drainages (Figure 1-4). A major feature of this watershed is that it is part of the North Umpqua Wild and Scenic River (Figure 1-1). The elevation ranges (Figure 1-2) from about 770 feet at the confluence of Rock Creek and the North Umpqua River in the west portion, to approximately 5,870 feet on Twin Lake Mountain in the southeastern portion of the watershed.

Climate and Vegetation: Average annual rainfall ranges from 45 to 50 inches depending on the elevation. Precipitation occurs in the form of rain for elevations below 2,500 feet and rain/snow mix for elevations above 2,500 feet. The majority of the watershed as a whole is dominated by mid and late seral forests (Figure 3-1).

People and Recreation: State Highway 138 follows the North Umpqua River throughout this watershed and is a major connector route between the Umpqua Valley and the Cascades. Because the North Umpqua Wild and Scenic River corridor extends throughout this watershed, there are many recreation opportunities including fishing, rafting, camping, picnicking, hiking, mountain biking and sight seeing. The major recreation developments are shown in Figure 2-1.

C. Ownership and Federal Land Use Allocations

Figure 1-3 shows the breakdown of federal administration and the private land ownership. The major private landowners most likely include Weyerhaeuser Co., Roseburg Resources Co., Seneca Timber Co., and Lone Rock Timber Co.

Land Owner	Acres	% of Watershed
BLM	11,897	10 %
Private Lands	12,521	10 %
Forest Service	99,488	80 %

Of the approximately 123,900 acres within Middle North Umpqua watershed, approximately 111,385 acres (90%) is federally managed under the following Forest Plan and Roseburg District RMP land use allocations (Figure 1-3, 1-5, Table 1-2, Chart 1-2) (note: these acreages are estimates based on computer generated maps):

Land Use Allocations	Acres	% of Federal	% of Watershed
Congressionally Reserved (Wild & Scenic/Wilderness)	11,260	10.1%	9%
Riparian & Other Reserves (FS & BLM)	17,247	15.5%	14%
Late Successional Reserve (FS)	60,942	54.7%	49%
Connectivity (BLM)	1,944	1.7%	2%
General Forest Management Area (GFMA) (BLM)	5,253	4.7%	4%
Matrix (FS)	14,739	13.2%	12%

Congressionally Reserved (Wild & Scenic/Wilderness)

Within the Middle North Umpqua 5th Field Watershed there are two Congressionally Reserved categories: The Boulder Creek Wilderness Area and the North Umpqua Wild and Scenic River. The outstandingly remarkable values for the North Umpqua Wild and Scenic Corridor are fish, water, recreation, scenery and cultural resources.

Riparian and Other Reserves (FS & BLM)

The Riparian and Other Reserves as shown on Figures 1-3 and 1-5, include riparian reserves, unmapped pre-1994 northern spotted owl (NSO) Residual Habitat Areas, designated habitat areas such as bald eagle habitat, and areas withdrawn because they are considered not suitable for timber production (TPCC).

The riparian reserves were established on federal lands as one component of the Aquatic Conservation Strategy to protect the health of the aquatic system and its dependent species and provide incidental benefits to upland species. The reserves were designated to help maintain and restore riparian structures and functions, benefit fish and riparian-dependent non-fish species, enhance habitat conservation for organisms dependent on the transition zone between uplands and riparian areas, improve travel and dispersal corridors for terrestrial animals and plants, and provide for greater connectivity of late seral forest habitat (ROD, B-13).

For BLM lands the riparian reserves were estimated from the stream network characterized by the Geographic Information System (GIS) computer database as well as on the ground verification and mapping of intermittent (1st and 2nd order) streams. A slope distance of approximately 180 feet was used as representing the average site-potential tree height of the Middle North Umpqua watershed (ROD, pg. 9). Thus the following riparian reserve widths were used for estimating the total amount of riparian reserves: 180 feet (55 meters) for intermittent, non-fish bearing streams and 360 feet (110 meters) for fish bearing streams. Actual intermittent streams are unmapped and known fish bearing streams are estimated based on a fish presence/absence inventories and professional knowledge on the ground. For this analysis the total amount of riparian reserves was estimated for mapping purposes so that known or suspected fish bearing streams received a 360 foot buffer while all other streams received 180 foot buffers. Actual projects would use on-the-ground stream information to establish Riparian Reserves.

There are six Residual Habitat Areas within and three others that partially overlap into the Old Fairview subwatershed. These areas of about 100 acres in size were located around pre-1994 nesting owl sites and are expected to provide some protection for suitable owl nesting groves. They are not, in themselves, expected to be capable of supporting pairs of nesting owls, but rather to provide nesting habitat in the future while the surrounding forest stands mature.

Areas designated as not suitable for timber production (TPCC withdrawn) are much smaller and scattered.

Late Successional Reserve (FS)
The management objectives for Late Successional Reserves (LSR) are to protect and enhance old-growth forest conditions. All 60,942 acres of these reserves in Middle North Umpqua are located on Forest Service lands (Figure 1-3, Table 1-2).

Connectivity (BLM)
The objective of these lands is commercial harvest on a 150-year cycle while providing a bridge between larger blocks of old-growth stands and Riparian Reserves. This provides habitat for breeding, feeding, dispersal, and movement of old-growth-associated wildlife. Middle North Umpqua contains approximately 1,944 acres of Connectivity most of which falls in the Old Fairview subwatershed. Figures 1-6, 1-7, 3-2 and Table 3-3 show the forest age classes within this land use allocation.

General Forest Management Area (GFMA) (BLM)
The objective of these lands is to manage on a regeneration harvest cycle of 70 to 110 years, leaving a biological legacy of 6 to 8 trees per acre (TPA). There is approximately 5,253 acres of GFMA in Middle North Umpqua, again, most of which falls in the Old Fairview subwatershed. Figures 1-6, 1-7, 3-2 and Table 3-3 show the forest age classes within this land use allocation.

Figure 1-7 depicts the past and potential timber harvest areas on federal lands in the Old Fairview subwatershed. At this point in time, the Green Thunder timber sale is the only planned regeneration harvest in this subwatershed. The other identified areas have the potential for density management or commercial thinning within the next 5 to 10 years. These stands will need more planning and are generally identified on Figure 1-7.

Matrix (FS)
Matrix are those lands outside all other reserve and designated categories. The Northwest Forest Plan (NFP) envisioned that most timber harvest and other silvicultural activities would be conducted in that portion of the matrix with suitable forest lands, according to standards and guidelines. Table 1-2 depicts the estimated amount of matrix lands on Forest Service lands. This estimate took out 50% of the land base for Riparian and Other Reserves (including 10 unmapped Residual Habitat Areas) based on similar estimates for matrix in the Rock Creek Watershed. Portions of the Cougar Creek subwatershed is also managed as a roadless area.

Key Watershed
In addition, the northwest portion of the watershed is designated as a Tier 1 (aquatic conservation emphasis) Key Watershed (see Middle North Umpqua Watershed Analysis, version 1.0, January, 2001, North Umpqua Ranger District, pages 5 and 7 and Figure 4). Key watersheds are designed to contribute to the conservation of at-risk anadromous salmonids and other resident fish species. The BLM portion of this key watershed includes a small amount (less than 100 acres) in the headwaters of T. 25 S., R. 1 W., Section 29 (Connectivity) and T. 25 S., R. 1 W., Sections 26 and 27 (GFMA). The majority of this key watershed has a Forest Service land use designation of Late Successional Reserve.

D. Management Direction And Key Questions

1. Upcoming Decisions Expected In Old Fairview Subwatershed

Within the next five to ten years, it is likely that the Swiftwater Field Manager will need to be involved with some aspect of decision making in the following general areas. These areas have been used to help guide the key questions, the information to answer those questions, and the resulting recommendations.

- Noxious weed control.
- Commercial thinning in GFMA & Connectivity.
- Thinning in Riparian Reserves for fish & wildlife objectives.
- Instream fish habitat enhancement.
- Road rehabilitation/restoration (decommission or treatment candidates).
- Culvert replacement or removal for fish passage or to reduce risk of failure.
- Urban interface fire prevention projects.
- Recreation and restoration potential opportunities with land exchanges/conservation easements.
- Hiking trail/bridge across North Umpqua connecting to North Umpqua trail.
- Large wood management in North Umpqua River related to rafting.
- Water quality issues related to developing a Water Quality Management Plan and monitoring.

A major assumption in the development of the following key questions is that the Roseburg District Resource Management Plan has given some prescriptive measures through the landscape land use allocations. Because this planning document sets standards and guidelines on each land use allocation and the kinds of activities that can occur in those land uses, this watershed analysis seeks to provide information to guide decision making within those overarching planning parameters. Guided by the above potential decision making areas, the key questions below seek to further focus the kinds of information that will be the most helpful for decision making.

2. Middle North Umpqua Watershed Key Questions

Human Uses (Laura Allen/Isaac Barner)

1. What are the current recreation uses and trends of the Middle North Umpqua watershed and Old Fairview subwatershed? Use categories include:
   - Rafting/Boating (Commercial & Non-Commercial)
   - Recreation Sites/Facilities
   - Trail Use (Hiking & Mtn Biking)
   - Fishing
   - Wildlife Viewing

2. Where are the developed and undeveloped human uses on federal, state, and county lands within the watershed?

3. What are the public concerns/values that are pertinent to the watershed (e.g. North Umpqua Wild & Scenic River Outstanding Remarkable Values)?

4. Who are the people/groups most closely associated with and potentially concerned about the watershed? What potential partnerships could be developed with restoration efforts?

5. What changes in human interactions have taken place since historic contact and what human effects have fundamentally altered the ecosystem?

6. What cultural resources and potential resources are present in the subwatershed and how will they be managed with associated future human activities?

Vegetation (Al James, Kevin Cleary, Roger Ferriel)

Risk/Hazard of Fire
1. How has fire historically influenced this ecosystem?

2. What risk is the current fuels condition posing?

3. What is the feasibility of reintroducing fire into the ecosystem?

Vegetation
1. What is the current *and past* distribution of each seral stage (acres & %) by each landowner?

2. Where are opportunities within the next 5-10 years for BLM commercial thinnings in GFMA & Connectivity?

Special Status Plants, Non-native Species and Noxious Weeds
1. Describe any Special Status Plant or Survey and Manage species that have been discovered within the watershed, their habitat, abundance, and distribution.

2. What are the relative abundance, distribution, and trends of non-native plants and noxious weeds?

Wildlife Habitat And Species (Jerry Mires)

1. How are habitats (including special habitats) related to the various guilds of species distributed across the Old Fairview subwatershed? How can Riparian Reserve thinnings/fuels management help increase species diversity (i.e. canopy structure, plant composition, large wood creation)?

2. What is the occurrence of federally listed terrestrial species and their designated core areas under the RMP? What is the occurrence of bureau sensitive (S&M, state listed) terrestrial species?

3. How can management activities in Connectivity and GFMA compliment habitat needs for these species?

Hydrology (Steve Kropp)

1. What are the general characteristics of the North Umpqua River? Related to hydrology (flows, side channel habitat, large woody debris), what features are unique on the mainstem

river? How has past management effected and how will present and future management direction effect the North Umpqua River?

2. What is the current list of 303(d) water quality limited streams and how are federal activities and plans affecting these streams? Where has monitoring taken place, what data is available, and what commitments does BLM make toward future monitoring and why?

3. How are the aquatic habitats distributed within the analysis area (wetlands, wet meadows, ponds and lakes, low gradient streams, floodplains, secondary channels, gravel bars)? Where are the stream habitats that particularly are structurally dependant on large instream wood?

4. Which reference reaches show the relative historic condition of the various stream channel types? How have alterations in the flow regime impacted low gradient instream habitats within the analysis area? To what extent is the lower gradient stream reaches properly functioning or degraded, and how have instream and off-stream habitats been affected by management activities?

5. Where are road erosion and stability problems most likely to impact aquatic resources? Where are riparian habitat enhancements and instream restoration activities likely to be most beneficial? Where would priority land exchange or conservation easements within the watershed enhance connectivity and riparian habitat for aquatic species?

Geology, Soils, And Stream Channels (Dan Cressy/Steve Bell)

Topography/Landslide and Debris Flow Analysis

1. What is the relative landslide potential (hazard) based on slope class, geology, soils and landform features? What management activities most contribute to this risk? What erosion processes are dominant in the watershed and where are the general risk areas? To what magnitude do the erosion processes contribute sediment in the watershed?

2. Where are the locations, stratified by relative degree of magnitude (i.e. High, Mod, Low - use supporting criteria), for sources of sediment and their proximity/relationship to adjacent streams?

3. What is the relationship between sedimentation and fish species and their habitat within the watershed?

Roads

1. What are the stratified road characteristics and recommendations according to character of road ditch, cut and fill erodability classes, road surfacing material, number, type, and condition of stream crossings, and other characteristics that influence erosion rates and sediment delivery to streams?

2. What road risks exist in the watershed and which risks have the potential to influence aquatic habitat?

Aquatic Habitat And Fish (Aimee Hoefs)

Fisheries Distribution/Species Occurrence/Abundance

1. What is the known current distribution of fish species within the watershed? (e.g. map of fish distribution by species. May not be able to produce for non-salmonids.)

2. What are the known human-created barriers to fish migration and their location within the watershed and what is the relative mileage of potential fish habitat, above human-created barriers, that is not currently accessible by anadromous fish?

3. What is the current Endangered Species Act (ESA) status of fish species within the watershed?

4. What locations, based on priority by species and abundance, are in need of restoration efforts? Display by high, mod, low and document supporting criteria.

Aquatic Habitat

1. What is the current condition of aquatic habitat based on relevant aquatic indicators? (Use most current ODFW aquatic inventory data, ODFW Benchmarks) Display each subwatershed based on habitat quality rating (i.e. High, Mod, Low and document supporting criteria).

2. What are the current riparian vegetation types and age classes?

Middle North Umpqua River 5th Field Watershed

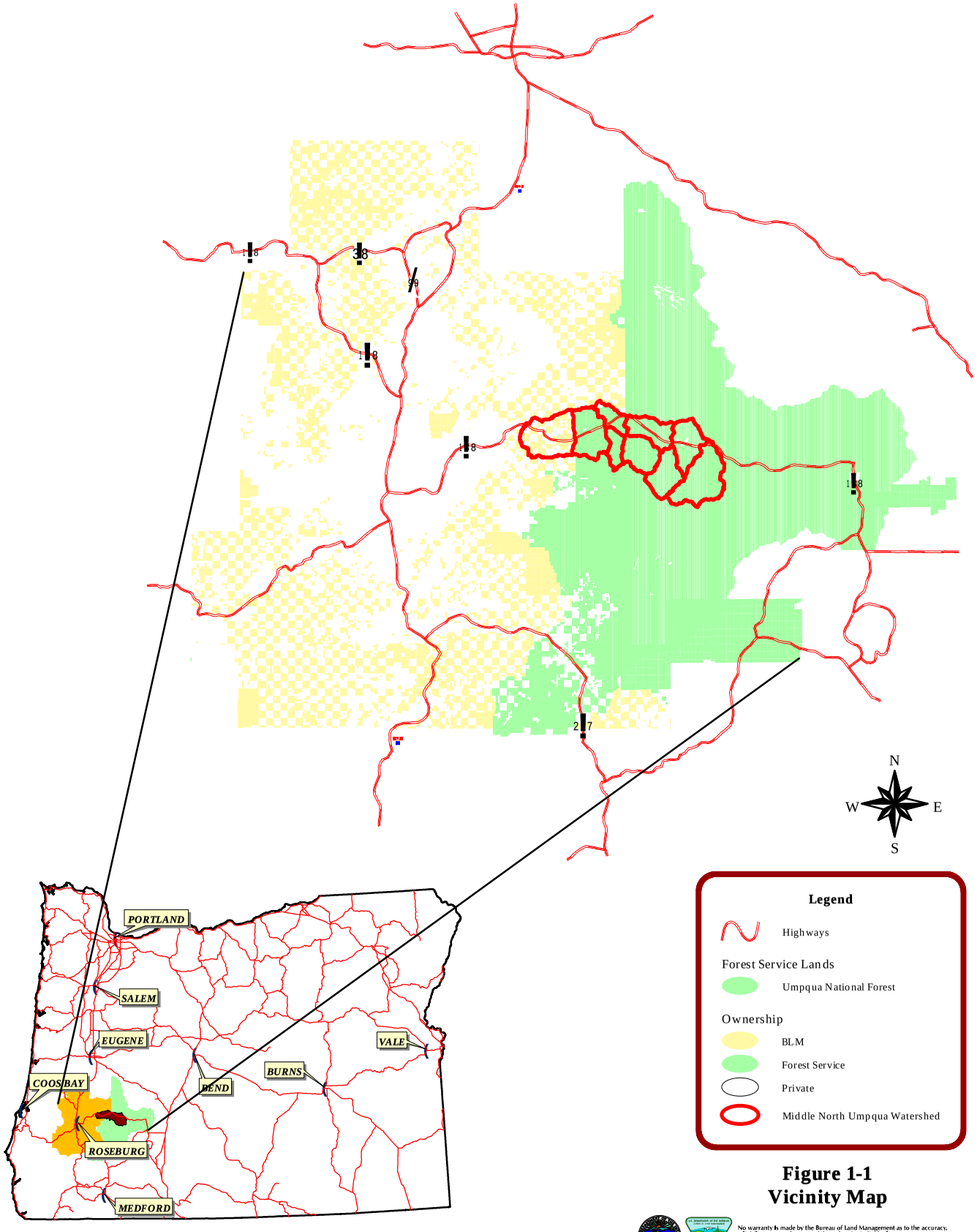


Figure 1-1
Vicinity Map

Middle North Umpqua 5th Field Watershed

Figure 1-2

Elevation and Major Streams

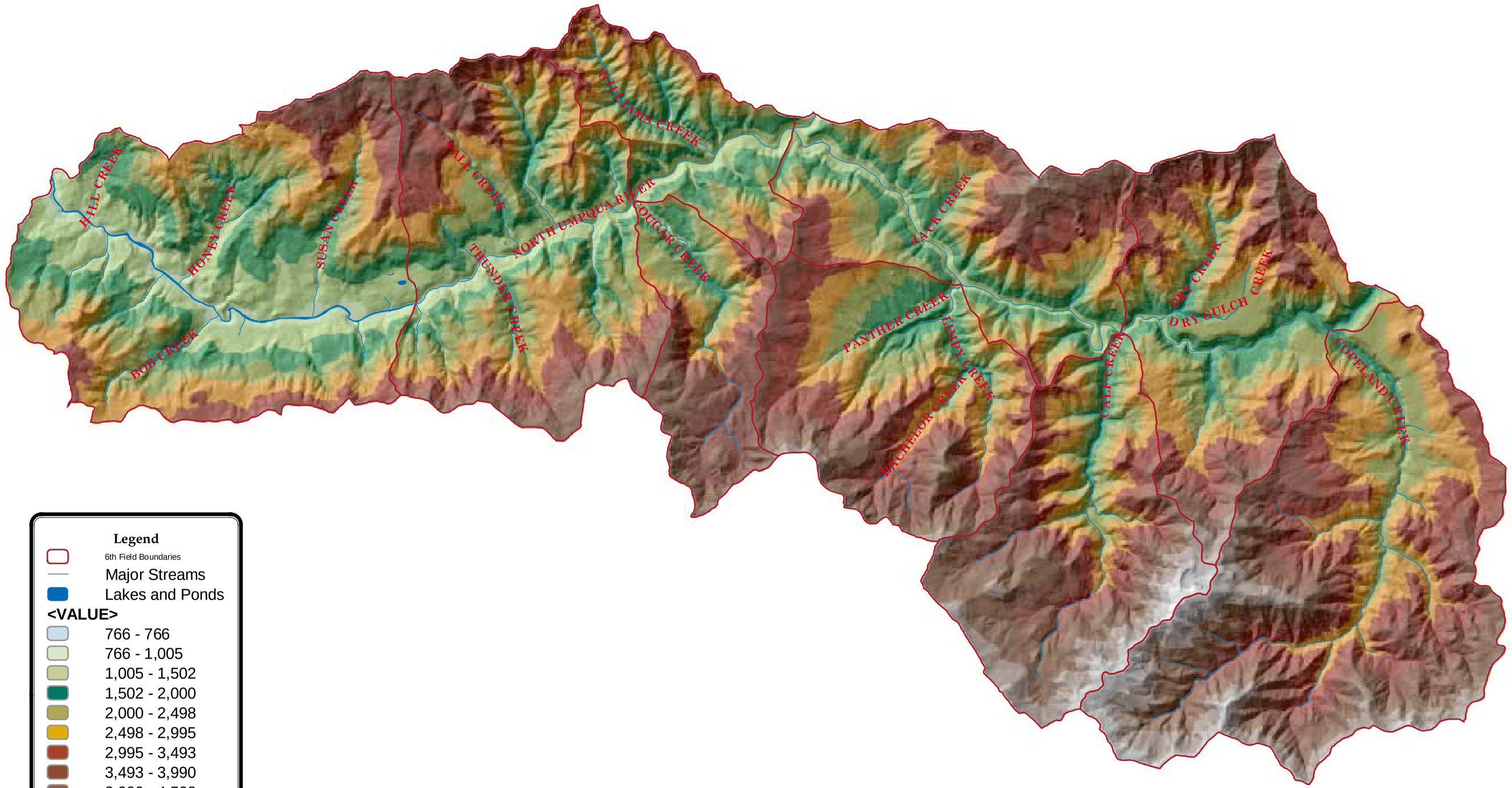
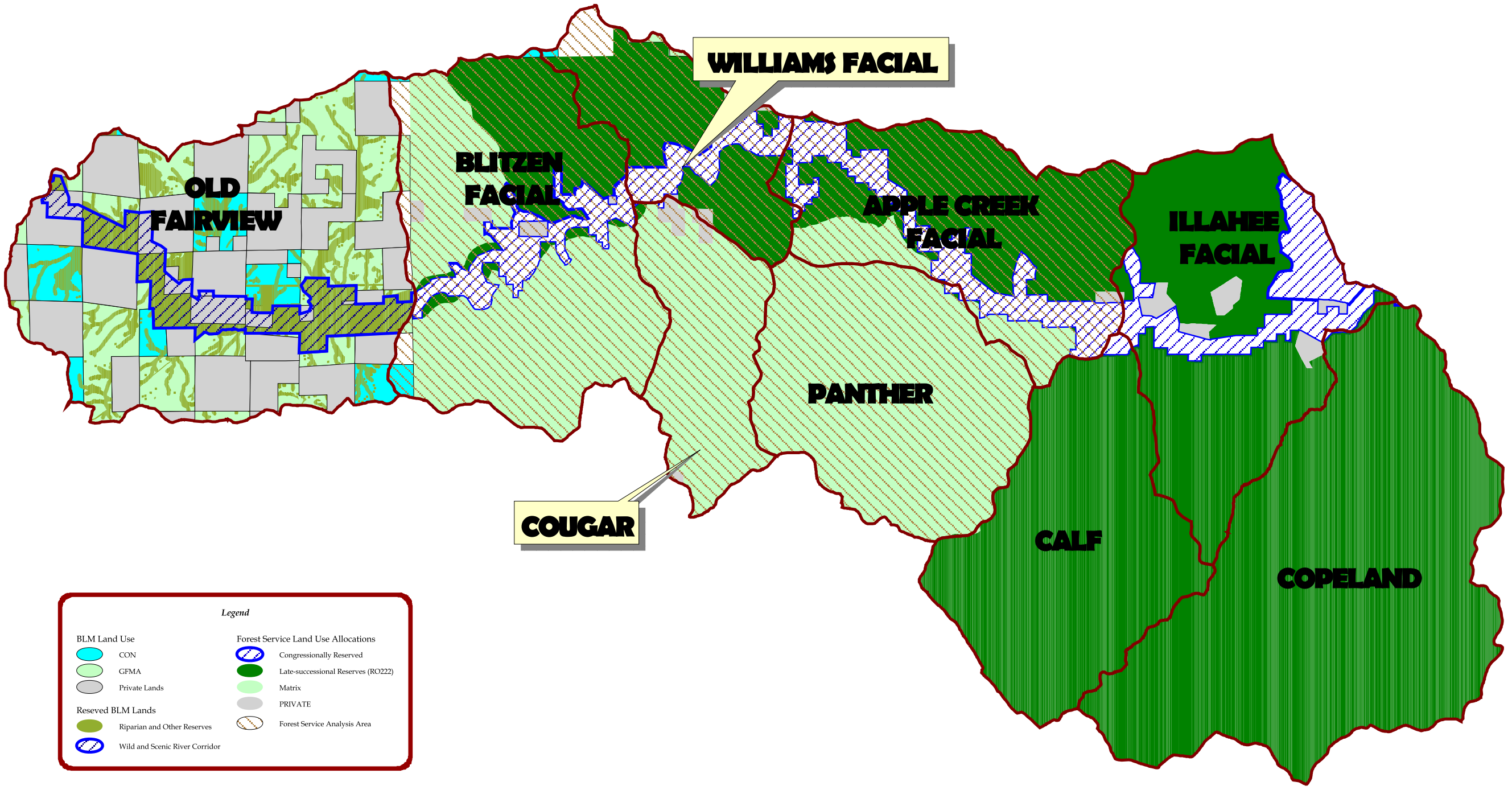


Figure 1-3

Middle North Umpqua 5th Field Watershed

Subwatersheds and Ownership



Legend

BLM Land Use
- CON
- GFMA
- Private Lands

Reseved BLM Lands
- Riparian and Other Reserves
- Wild and Scenic River Corridor

Forest Service Land Use Allocations
- Congressionally Reserved
- Late-successional Reserves (RO222)
- Matrix
- PRIVATE
- Forest Service Analysis Area

N

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No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

Table 1-1 Middle North Umpqua, Public and Private Lands

	BLM		Forest Service		Private Lands		TOTAL
Subwatersheds	acres	%	acres	%	acres	%	**ACRES**
Old Fairview	11460	52.3%	0	0.0%	10461	47.7%	21921
Blitzen Facial	354	2.1%	15591	94.1%	621	3.7%	16566
Williams Facial	83	1.3%	5791	90.0%	557	8.7%	6431
Apple Creek Facial	0	0.0%	11778	99.5%	54	0.5%	11832
Illahee Facial	0	0.0%	12923	95.8%	570	4.2%	13493
Cougar	0	0.0%	5715	95.7%	258	4.3%	5973
Panther	0	0.0%	12164	100.0%	0	0.0%	12164
Calf	0	0.0%	12538	100.0%	0	0.0%	12538
Copeland	0	0.0%	22988	100.0%	0	0.0%	22988
TOTAL	11897	9.6%	99488	80.3%	12521	10.1%	123906

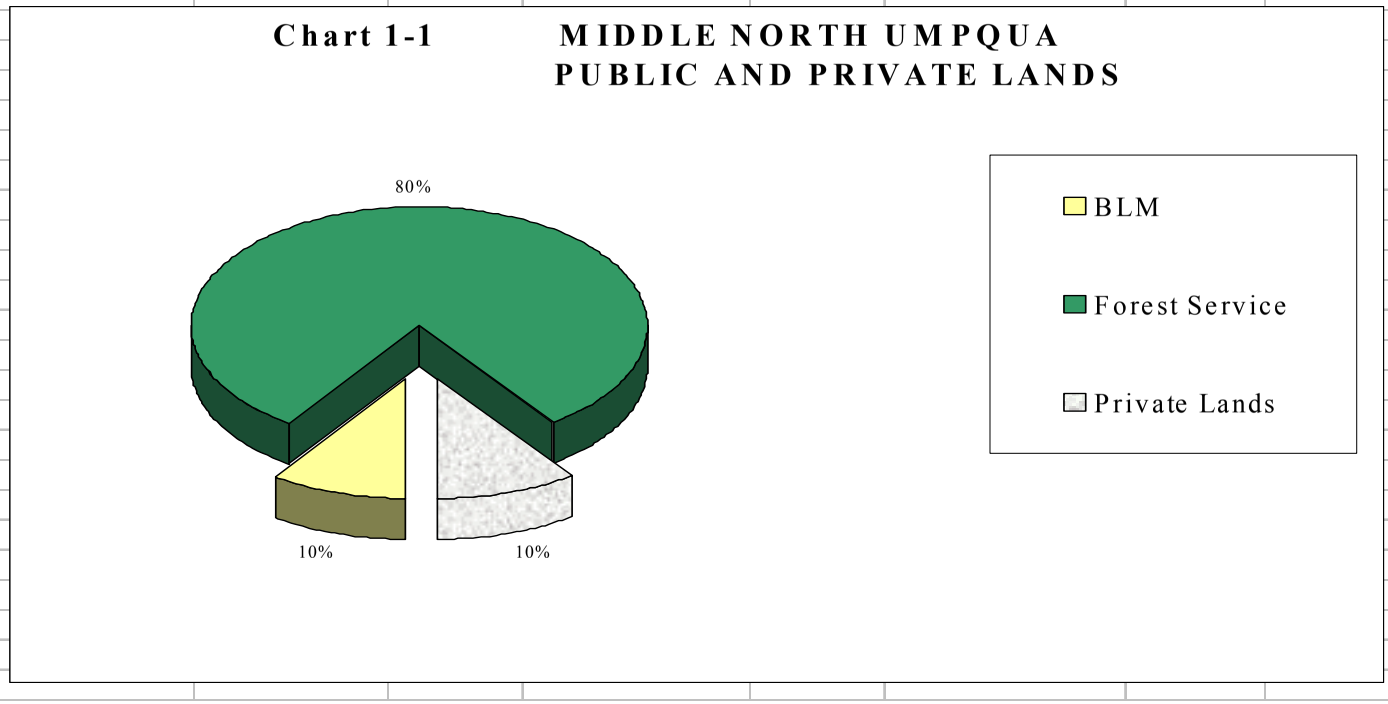


Table 1-2 Middle North Umpqua Public Land Use Allocations and Private Lands

	Congressionally Reserved (Wild & Scenic/Wilderness)		Riparian & Other Reserves*		Late Successional Reserve (FS)		Connectivity (BLM)		GFMA (BLM)		Matrix (FS)		Private Lands	
Subwatersheds	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
Old Fairview	2192	10.0%	2508	11.4%	0	0.0%	1725	7.9%	5035	23.0%	0	0.0%	10461	47.7%
Blitzen Facial	1884	11.4%	4948	29.9%	3811	23.0%	194	1.2%	160	1.0%	4948	29.9%	621	3.7%
Williams Facial	1200	18.7%	1	0.0%	4589	71.4%	25	0.4%	58	0.9%	1	0.0%	557	8.7%
Apple Creek Facial	2952	24.9%	910	7.7%	7007	59.2%	0	0.0%	0	0.0%	910	7.7%	54	0.5%
Illahee Facial	2839	21.0%	0	0.0%	10084	74.7%	0	0.0%	0	0.0%	0	0.0%	570	4.2%
Cougar	19	0.3%	2831	47.4%	34	0.6%	0	0.0%	0	0.0%	2831	47.4%	258	4.3%
Panther	43	0.4%	6043	49.7%	36	0.3%	0	0.0%	0	0.0%	6043	49.7%	0	0.0%
Calf	106	0.8%	7	0.0%	12418	99.0%	0	0.0%	0	0.0%	7	0.1%	0	0.0%
Copeland	25	0.1%	0	0.0%	22963	99.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
TOTAL	11260	9.1%	17247	13.9%	60942	49.2%	1944	1.6%	5253	4.2%	14739	11.9%	12521	10.1%

*Forest Service Riparian and Other Reserves are estimated at 50% of entire Matrix lands based on similar reserves for Matrix in the Rock Creek Watershed.
(Pers. Comm., Joe Graham, Roseburg District Inventory Specialist)

Chart 1-2 MIDDLE NORTH UMPQUA PUBLIC LAND USE ALLOCATIONS AND PRIVATE LANDS

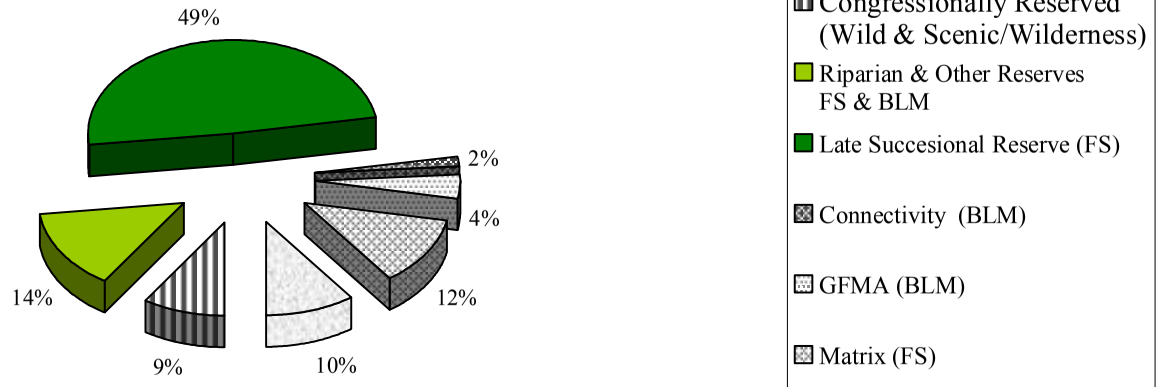


Figure 1-4

Old Fairview 6th Field Watershed

7th Field Drainages

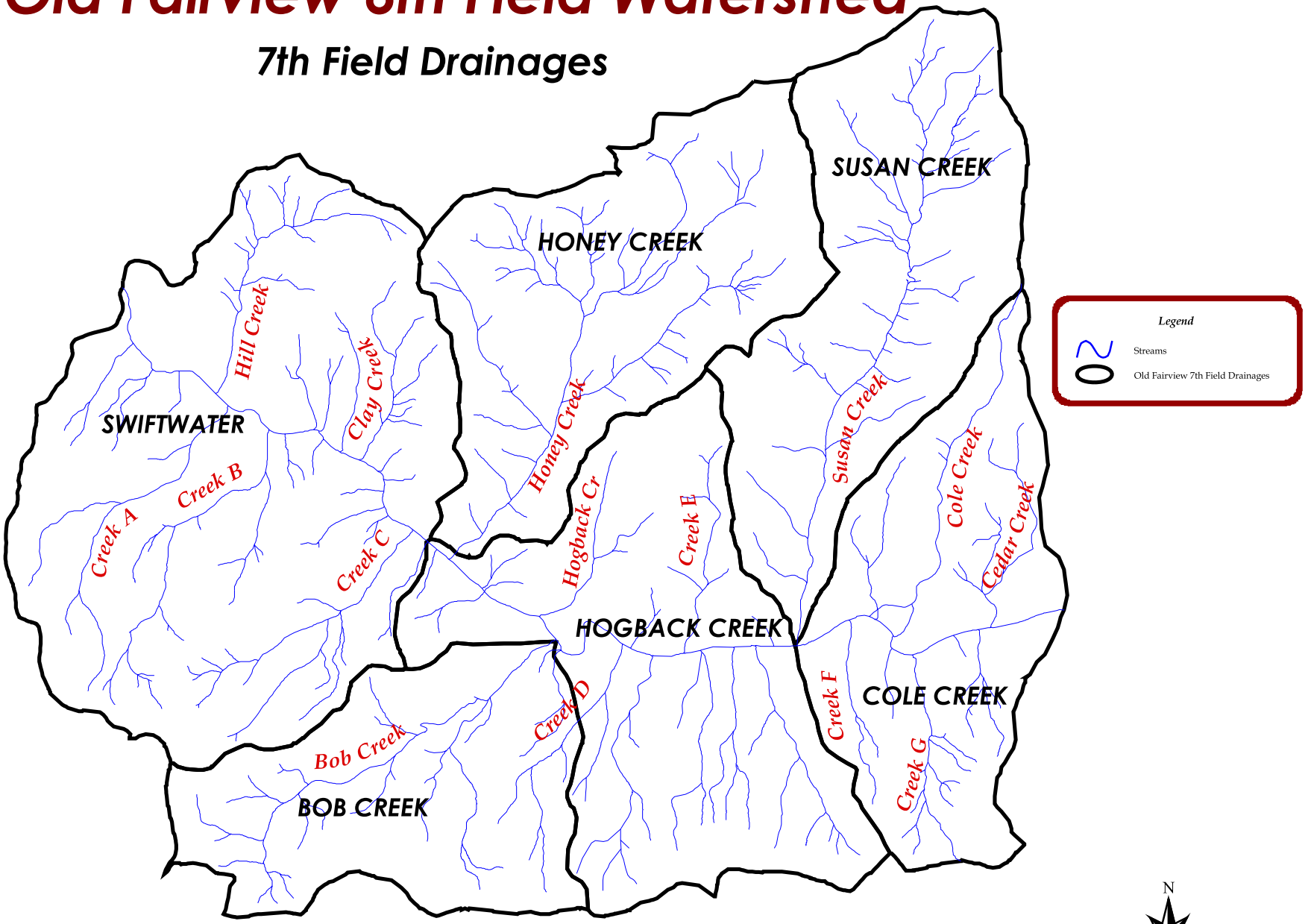
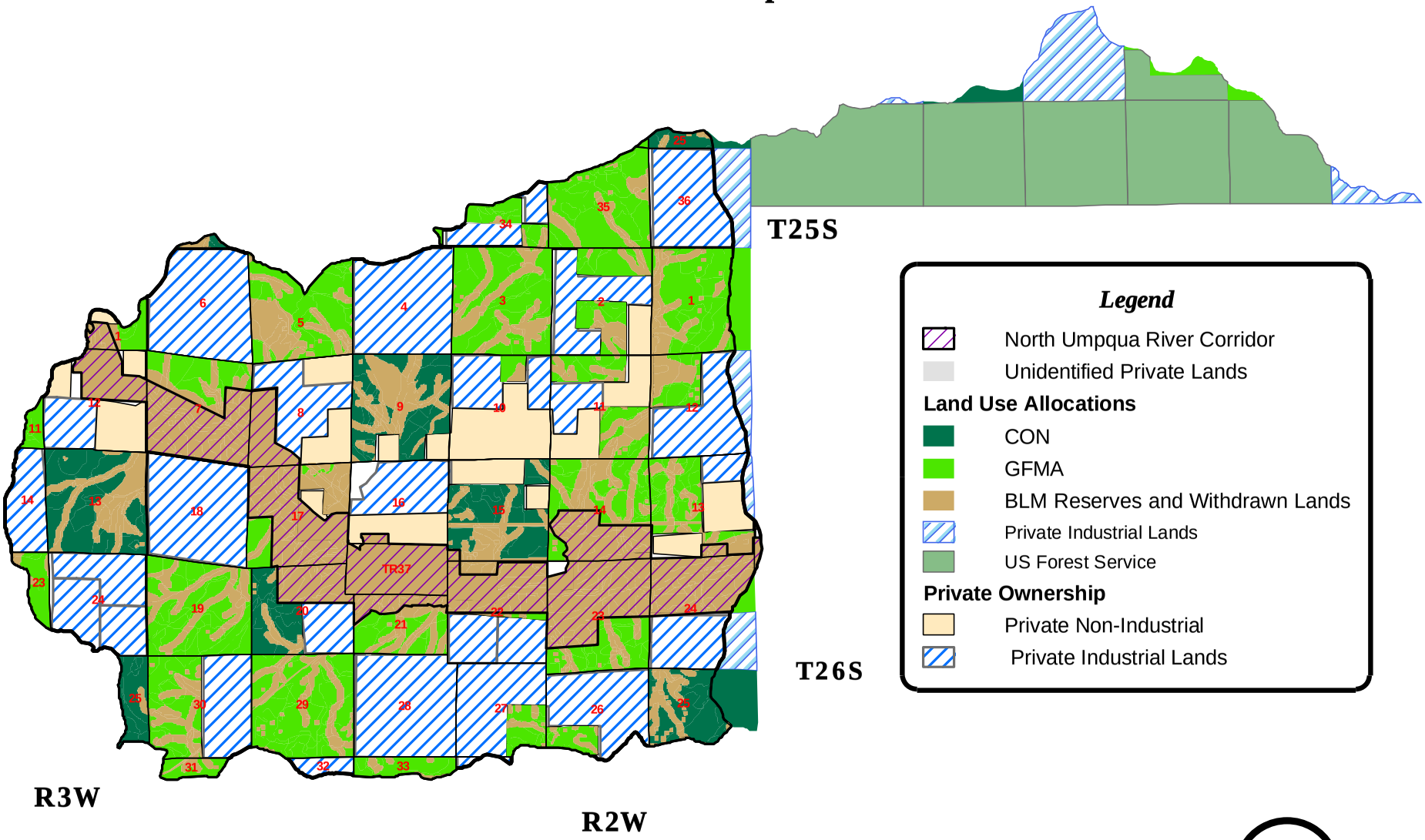


Figure 1-5

Old Fairview 6th Field Watershed

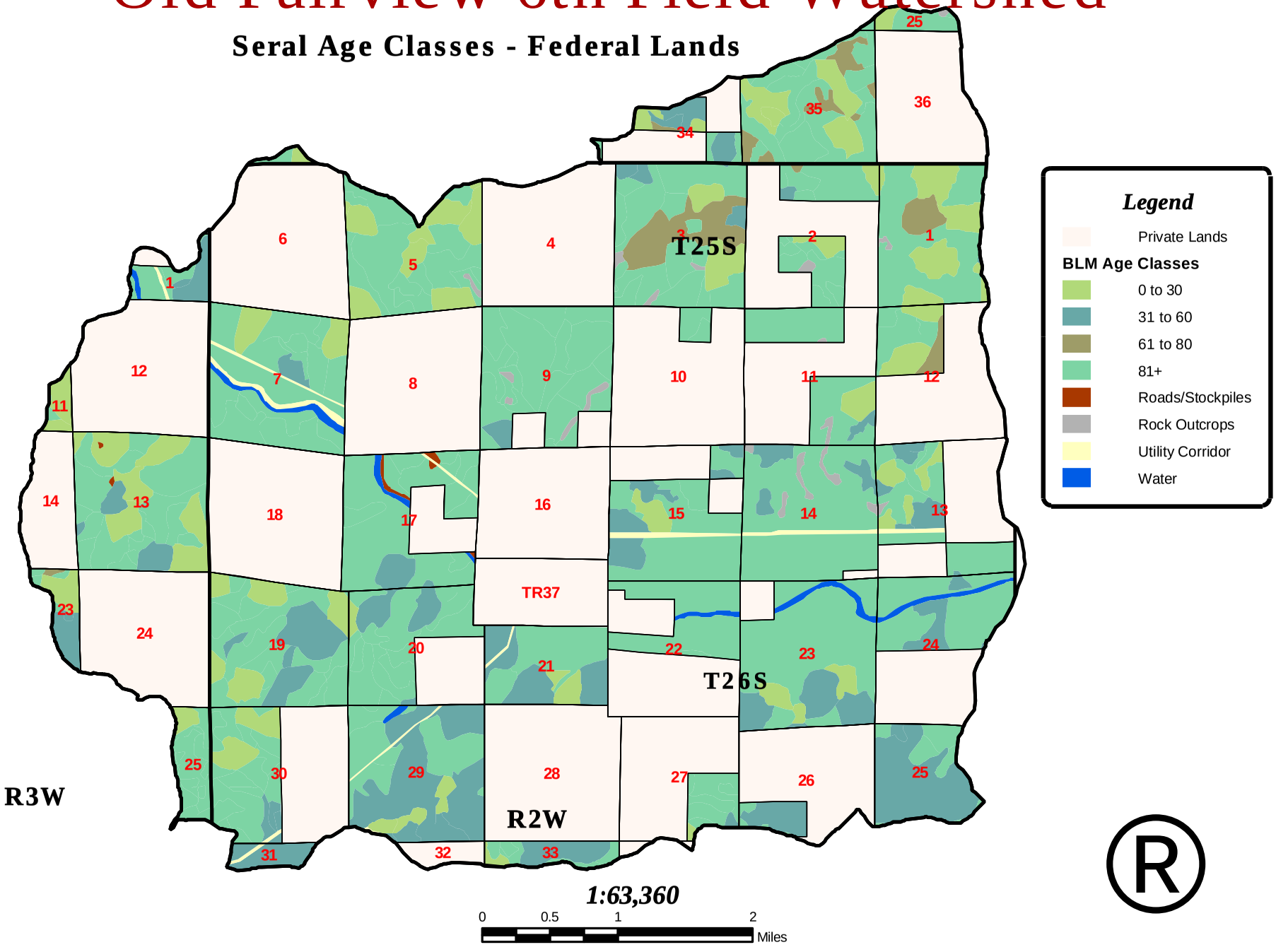
Land Use and Ownership



Old Fairview 6th Field Watershed

Figure 1-6

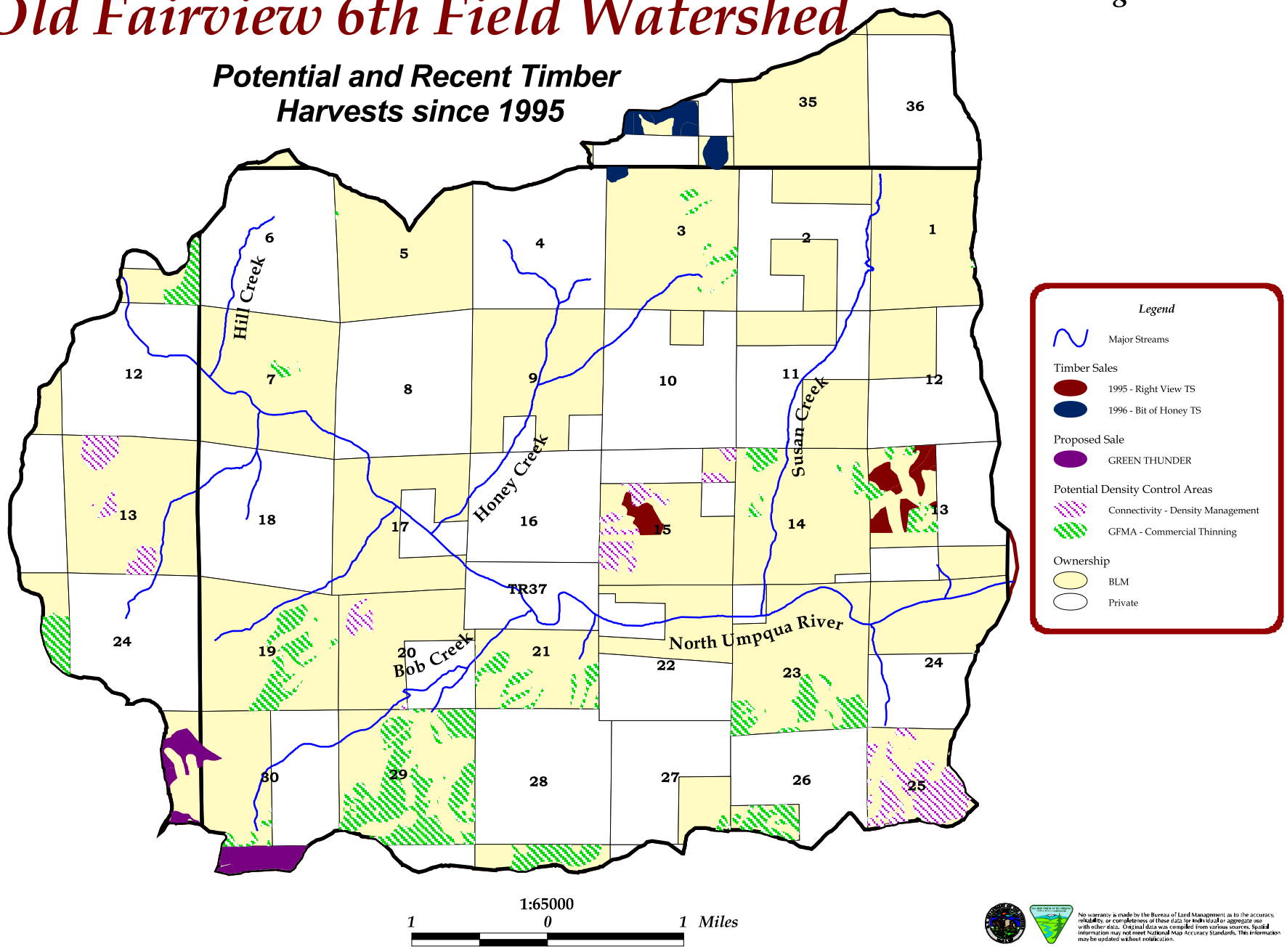
Seral Age Classes - Federal Lands



Old Fairview 6th Field Watershed

Figure 1-7

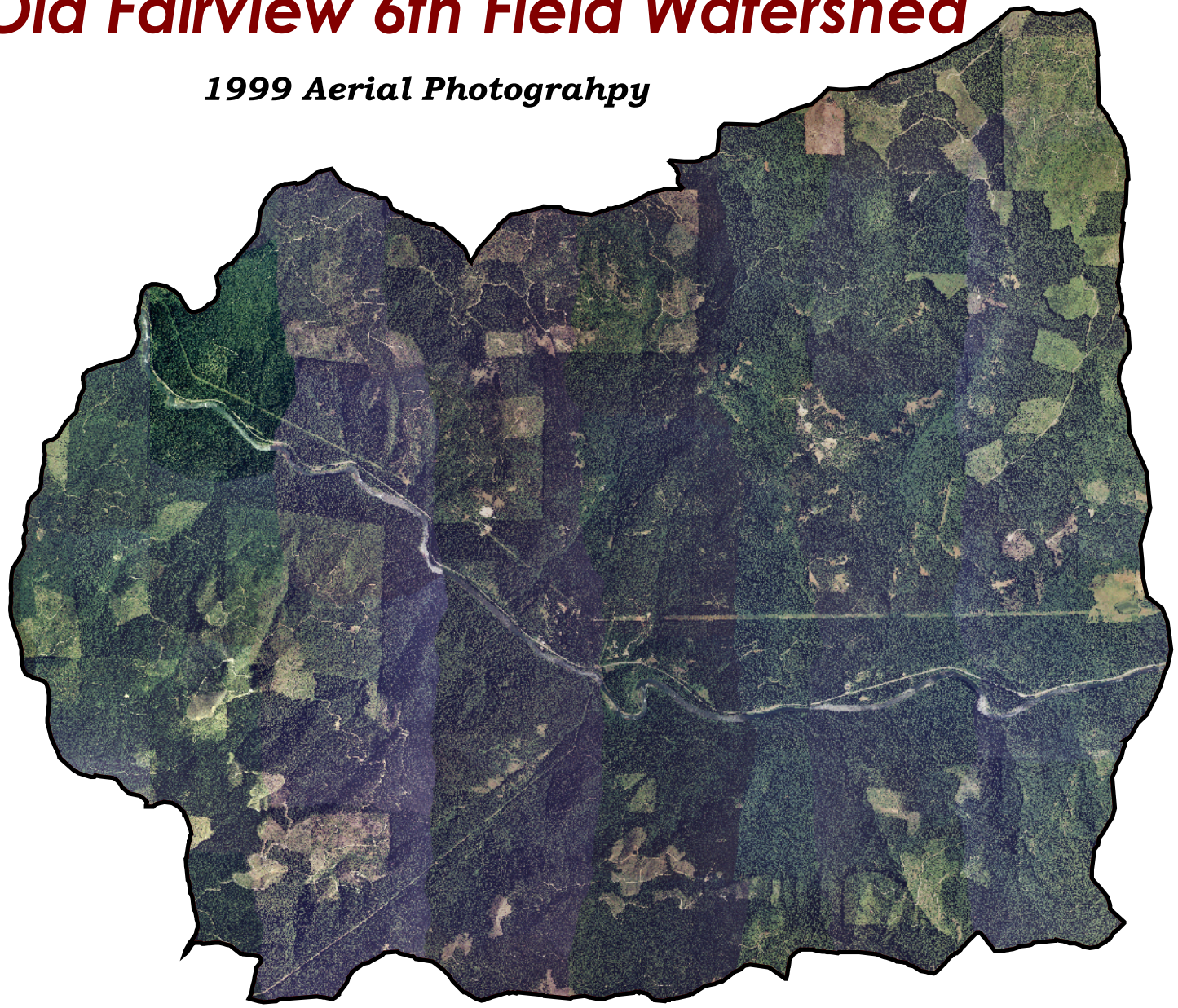
Potential and Recent Timber Harvests since 1995



Old Fairview 6th Field Watershed

Figure 1-8

1999 Aerial Photograhpy



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2 HUMAN USES

A. Management Direction and Recreation, Middle North Umpqua

In 1983, a portion of the North Umpqua River Recreation and Scenic Area was designated as an Area of Environmental Critical Concern (ACEC) as part of the Record of Decision for Roseburg District's Timber Management Plan. This information is recorded in the Management Plan for the North Umpqua Special Recreation Area and Area of Critical Environmental Concern. The North Umpqua River was designated a recreational river in the National Wild and Scenic River System in the Omnibus Oregon Wild and Scenic River Act of 1988 (Omnibus Act). Lands along the river corridor within the Middle North Umpqua watershed are included in this designation (Figure 2-1). In 1992, the U.S. Forest Service, Bureau of Land Management, and Oregon Parks and Recreation Department cooperated with numerous local, state, and federal agencies to create The North Umpqua River Management Plan.

In 1994 an amendment was made to the plan incorporating the NFP criteria regarding development in riparian areas. In the 1994 Roseburg Management Plan, it is noted that the management plan for the North Umpqua Special Recreation Area and Area of Critical Environmental Concern needs to be updated and revised to be consistent with the North Umpqua River Management Plan and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl.

The Roseburg District Resource Management Plan (RMP) states that Special Recreation Management Areas will be managed under the following objectives:

1. Identify, plan, and implement high priorities for recreational and interpretive opportunities for the public, emphasizing camping, picnicking, hiking, nature study, interpretation, watchable wildlife, driving for pleasure, horseback riding, mountain biking, white water sports, fishing, swimming, recreational gold panning, and other compatible activities.

2. Identify the need for and secure funding to develop priority areas. Utilize outside funding programs and initiatives including volunteer labor.

3. Develop partnerships with public agencies, private landowners, and recreation user groups or individuals to promote recreation opportunities.

The following categories describe the most popular types of recreation uses within the Old Fairview subwatershed:

Popular Recreation Uses
Table 2-4 shows the overall recreation uses with the Old Fairview subwatershed. The entire Middle North Umpqua 5th field watershed attracts a significant amount of recreation use. The corridor is along Highway 138, which connects Roseburg to Diamond Lake and Crater Lake, so this watershed receives much tourist use by people in route to other places. The area also supports such activities as fishing (bait fishing and fly fishing), rafting, camping, mountain biking, hiking, swimming, wildlife viewing and sight seeing.

Trail Use
During the summer of 1994 a counter was placed at each trail parking area, and a trail counter was placed at Susan Creek Falls Trail and at Deadline Falls Watchable Wildlife Area. The use was counted between early May through August. The North Umpqua Trailhead averaged about 56 vehicles per day. Swiftwater Day-use area averaged 133 vehicles per day. Susan Creek Picnic area averaged about 51 vehicles per day. Susan Creek Falls Trail averaged about 18 people per day.

Fishing Use
In addition to the trail counters, BLM employees counted the number of vehicles in the parking areas. Based upon these counts, it was determined that most of the fishing use (at least at Swiftwater/North Umpqua Trail area), takes place around dusk and dawn (before and after the monitoring takes place). Between May and September of 2000, there were approximately 2300 fishermen seen fishing in this watershed. Although the number of fishermen seen is typically between 2300-3000, the adjusted use is probably closer to 4,000-6,000. Fly Fishing on the North Umpqua River became popular about the 1930's.

Boating Use
Table 2-1 shows total boating use for the entire Middle North Umpqua watershed by year and Table 2-4 shows average total boating use within Old Fairview. Table 2-5 separates boating use within Middle North Umpqua by commercial versus non-commercial use. Within Old Fairview during the 2000 summer use season, there were approximately 530 people seen boating, but the actual use was probably closer to 670. Actual use is referred to as adjusted use. Adjusted boating use is calculated by comparing reported commercial use with the observed use, and then deducing a percentage factor of people missed. The number of boaters seen in this subwatershed is typically between 600-900. Boating on the North Umpqua River did not become popular until the late1970's. Tables 2-3 and 2-4 show adjusted boating use along the North Umpqua Wild and Scenic River for the past four years.

As shown in Table 2-1, the boating use trends have varied from year to year but overall have remained fairly constant. Boating use seems to be correlated to the amount of water flow in the river.

Table 2-1 Total Boating Use within Middle North Umpqua

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
6,842	5,842	3,350	5,422	4,744	5,336	6,146	6,696	6,655	6,407	6,330

B. Developed and Undeveloped Recreation Sites and Management

Recreation Sites/Facilities
Old Fairview subwatershed has one developed campground, a variety of dispersed and developed day use areas with trails, and a recreation trail that runs adjacent to the North Umpqua River. BLM manages Susan Creek Campground, Susan Creek Picnic Area, Susan Creek Falls, and the North Umpqua Trail. BLM also manages the Swiftwater Day Use Area which is just below the confluence of Rock Creek and the North Umpqua (west and slightly outside the watershed boundary). Douglas County manages Smith Springs Wayside, Baker Wayside, Hill Creek Wayside, Cable Crossing Wayside, and Swiftwater Park. There is one privately owned mobile home/RV park (Susan Creek), one motel (Dogwood), and one proposed motel (near Susan Creek Falls) within this watershed. To see the actual location of the public recreation sites, refer to Figure 2-2. Table 2-2 shows the use trends for Susan Creek Campground. Tables 2-6 and 2-7 show a detailed breakdown of the public facilities.

Table 2-2 Campground Use Trends at Susan Creek Campground

1995	1996	1997	1998	1999	2000
10,000	9,627	9,378	9,157	9,096	8,037

Recreation Site Hazard Tree Treatment
Annual hazard tree assessments are conducted on or about November 15 at BLM recreation sites and trails. Trees that are identified as hazards to public safety are treated. The preferred treatment, whenever possible and when such treatment will mitigate the safety hazard, is to climb and remove the dead limbs and/or tops. When it is feasible, trees may be topped with the remainder left for wildlife habitat. This treatment will be considered only where the remainder of the tree will not be so tall as to pose a future risk of failing and hitting a target of value. When possible, cut trees will be left on site for their wildlife value, and/or as barrier logs to discourage access into vegetation areas or other areas to discourage foot or vehicular traffic. Placement options will also include streamside and instream placement of whole trees and/or tops. In some cases, if the amount of down material in a particular area is excessive, some of the down material may be removed from the site either as sold logs or as firewood. The hazard tree assessment method is a standardized method used throughout the BLM and USFS and is described in the booklet "Long-Range Planning for Developed Sites in the Pacific Northwest: The Context of Hazard Tree Management". Such assessments are required by BLM on an annual basis.

Table 2-3 is a close estimate of the trees which were cut in the recreation sites and trails over a seven year period. It is estimated that 80-90% of the cut trees are of the 4"-16" size class. It should also be noted that the recreation planner during this seven year period had a tree replacement policy which included replacing each cut tree with four planted trees.

Table 2-3 Hazard Trees Felled in Recreation Sites and Trails

Site	1993	1994	1995	1996	1997	1998	1999
Susan Creek	3	0	4	8	5	3	14
Trails							
North Umpqua	0	0	0	0	2	1	0
Susan Creek Falls	0	0	0	0	2	12	0

Flood Plain Location

The North Umpqua River Analysis (December 1999, page 28, Table 3) shows the amount of developed recreation facilities within the 25- and 100-year flood plain stages. As stated in that analysis, most of the recreation sites have not restricted the connectivity of the river with its flood plains, but the creation of roads, paving of roads, and hazard tree timber sales in flood plains have created a loss in roughness. The River Analysis states that the trend has potentially had some degree of impact on the proper functioning of about 17% of the 100-year flood plain area. BLM has three sites that fall within the 100-year flood plain: the lower section of Susan Creek Campground, the Susan Creek Boat Launch Site, and Stick Beach. None of the recreation sites are within the 25-year flood plain except Stick Beach. Due to the BLM's hazard tree policy (see above) and the number of trees left standing within the recreation sites, these recreation sites retain a degree of roughness within the flood plain. The Susan Creek Boat Launch site is minimally developed; the site has brush, standing trees, and is not paved. Stick Beach is not paved and is undeveloped.

Main Stem North Umpqua River Large Wood Management within Old Fairview

The Roseburg District policy regarding large woody material is recorded in the North Umpqua River Management Plan on page 27. The plan notes that "down and stable woody material, including tree boles, roots, and limbs will be removed from streams only on the recommendation of a fish biologist or hydrologist unless it is an immediate threat to safety. Stable material is defined as that material which will not float downstream and cause unacceptable damage during a 25-year flood. Fallen trees will not be removed from the river unless they pose a hazard to human life or to one of the Outstandingly Remarkable Values (ORV's). Where practical, hazard trees will be repositioned in the river, to remove the hazard and retain fish habitat. Management objectives for safety along the North Umpqua River (according to the North Umpqua River Management Plan, pages 17-28) are as follows: to manage, maintain, and enhance transportation facilities for safe access to recreation facilities and opportunities within the corridor, and promote safe recreational use within the corridor. During the past 30 years, the Roseburg BLM has not removed any large woody debris from the North Umpqua River for recreation safety reasons.

C. Social Values and Groups Concerned about the North Umpqua River

Watershed Values
The North Umpqua River Management Plan identified the following five ORV's: fish, water quality, recreation, scenery, and cultural resources. The plan also emphasized the importance of protecting these resources through monitoring programs.

Concerned Groups and People
Government agencies involved with management decisions within the North Umpqua River corridor are: the Umpqua US Forest Service, the North Umpqua Ranger District US Forest Service, the Roseburg District of the Bureau of Land Management, the Oregon State Parks, the State of Oregon Water Resource Department, the State of Oregon Waterway Planner from the Division of State Lands, the State of Oregon Department of Forestry, the Waterway Planner from the State Marine Board, the Douglas County Planning Department, the Douglas County Parks Department, the Board of County Commissioners of Douglas County, the North Umpqua Planning and Advisory Commission, the Department of Fish and Wildlife, and the Department of Transportation. The following is a partial list of groups and organizations who have demonstrated an active interest in the management of this river corridor: the North Umpqua Business Association, the Association of O&C Counties, Umpqua Watershed, Inc., Association of Guides and Packers, Douglas County Timber Operators, Friends of the Umpqua, the Good Sam Club, Northwest Rafters Association, Oregon Trout, Oregon Rivers Council, Roseburg Rotary Club, Steamboaters, Umpqua Fishermen, Oregon Equestrian Trails, adjacent landowners, and boating and fishing outfitter guides licensed to do business on this portion of the river.

D. Historic Human Use

Human interactions have changed from those associated with the basic subsistence activities of hunting, plant gathering, and fishing to those largely related to recreation, residence, and logging. For at least 8,000 years and perhaps 11,000 years, human uses in the watershed were probably transitory, geared to the extraction of seasonally available resources. No long-term residential sites dating to the prehistoric period are known as yet.

Although Euroamerican use of the watershed began in the mid-eighteenth century, it too was largely transitory until after World War I when the Biddle Ranch was established near the eastern edge of the watershed. A decade later, in the early 1930's, the Doyle brothers established homesteads in the upper reaches of Honey Creek. Subsequent residential locations have been concentrated between Honey Creek and Susan Creek.

Logging and recreation use did not see significant increases until the 1940's, with the demand for lumber created by World War II, the development of the North Umpqua hydroelectric project in the late 1940's, and the improvements to the North Umpqua Highway. Spurred on by the North Umpqua hydroelectric project and its need for a transportation network, a dirt and gravel road linking the Umpqua Basin with Highway 97 was completed by 1940. The road, however, was narrow and involved a circuitous route up Copeland Creek. The paved highway to the Cascade

crest, with its current alignment, was completed in 1964. Recreation use and logging began to boom shortly thereafter.

E. Cultural Resources

Thirty-two prehistoric sites and five historic sites are currently known to exist within the watershed. Thirty of the prehistoric sites are located on BLM land, two on private property. The five historic-era sites are all on private property. Eighteen of the 30 BLM sites have been evaluated. Thirteen have been found to be eligible for listing on the National Register of Historic Places. One of them, the Susan Creek Indian Mounds, is listed. The 30 sites within the watershed represent 17 percent of the District total. All but three of the prehistoric sites are on the north side of the North Umpqua River.

The prehistoric sites within the watershed range from lowland riverside terraces to the highest ridge crests. They include major base camps along the river, upland hunting camps, ridge crest tool stone quarries, and at least one vision quest site. Prehistoric use includes the oldest documented occupation in the Umpqua Basin, about 8,400 years old. Prehistoric use within the watershed is not only old, but also extensive and intensive. Site densities, especially on the north side of the river, are among the highest in the Umpqua Basin. Evaluated sites in the watershed exhibit some of the densest artifact distributions known for the basin. For these reasons, cultural resources were determined to be an Outstandingly Remarkable Value during the Wild and Scenic River evaluation process.

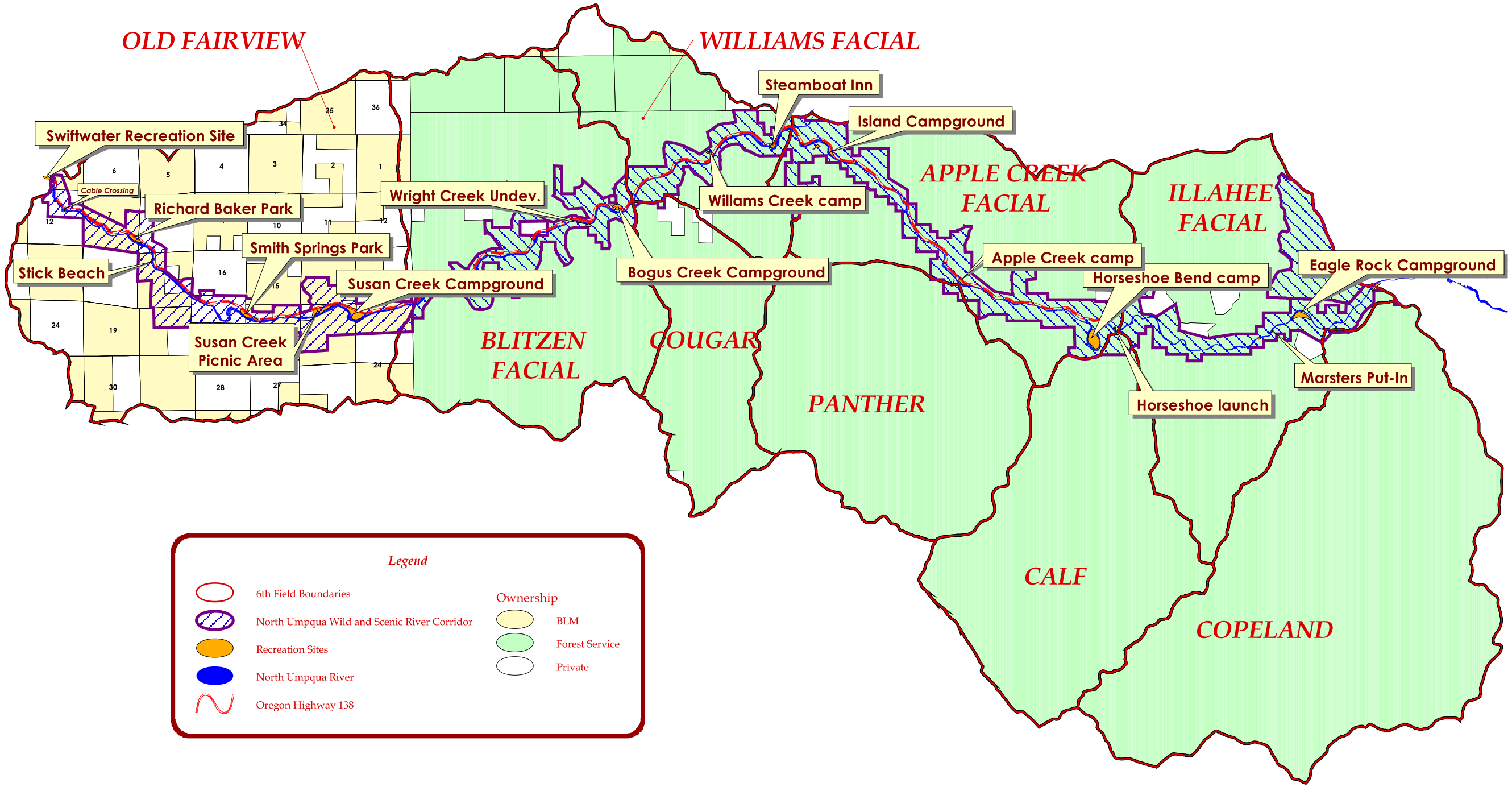
The recorded historic sites within the watershed date from the 1920's and 1930's. They include a log smokehouse, two log cabins, a log house, and a shed. They are associated with homesteading and ranching pursuits. Two of the resources, a cabin and a shed, are located in the uplands, have been abandoned, and are in poor condition. The other three resources are located on an active ranch and are in better condition.

The resources that might be affected by federal actions will continue to be managed under the mandates of the various laws that specify federal responsibilities for cultural resources.

Figure 2-1

Middle North Umpqua 5th Field Watershed

Recreation Sites within the Middle North Umpqua Watershed and North Umpqua Wild and Scenic River Corridor



Old Fairview 6th Field Watershed

Figure 2-2

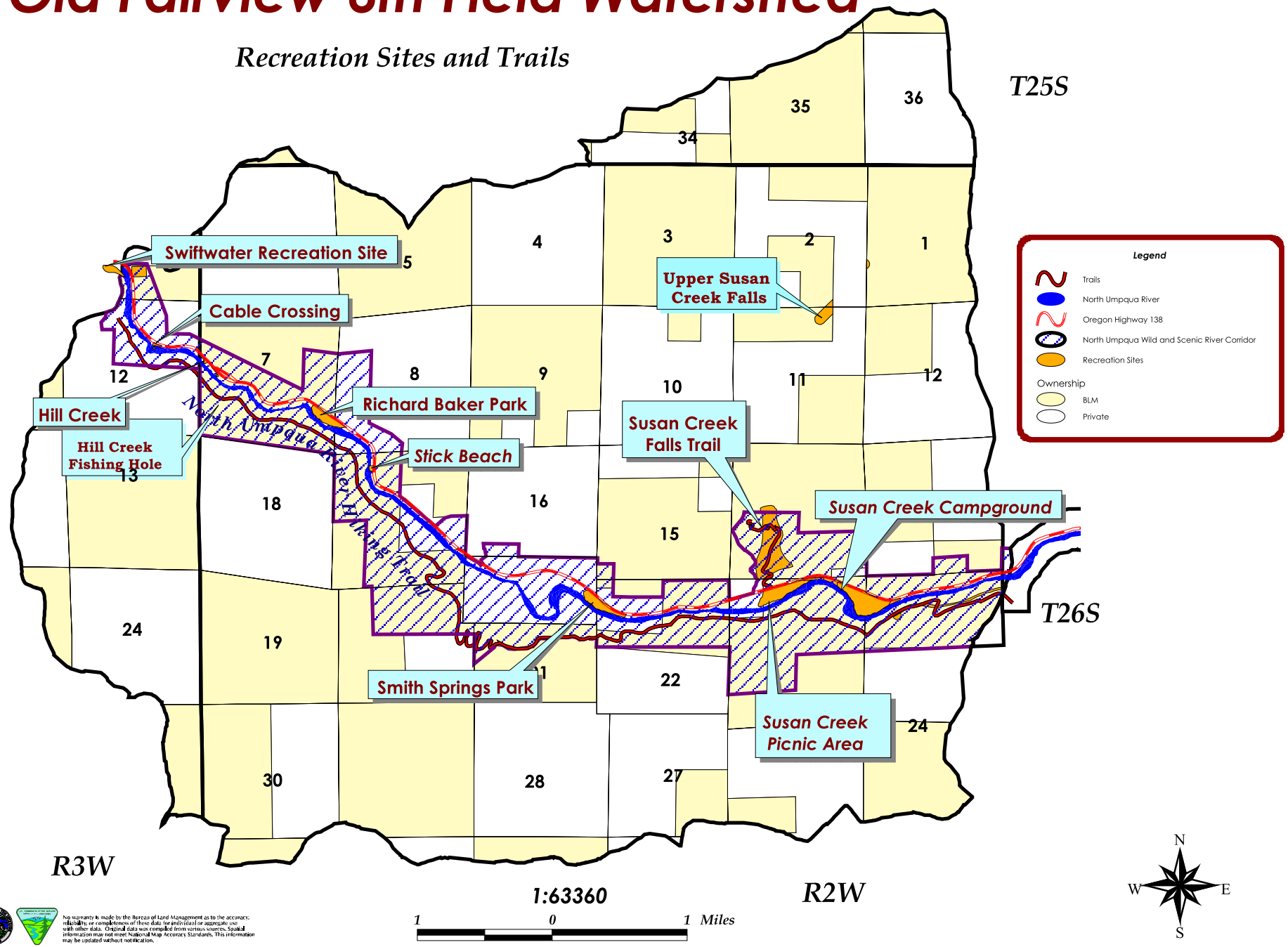


Table 2-4 Recreation Use Averages Old Fairview Subwatershed

Recreation Use	Average Number of Users during Summer Season	Average Use/Day during Summer Season
North Umpqua Trailhead	7,000-10,000 people	56 vehicles in parking area
Deadline Falls (1st 1/4 mile of the North Umpqua Trail)	1,120 people	10 people
Susan Creek Falls	2,800 people	25 people
Fishing Use	5,000 people	45 people
Boating Use	600-800 people	6 people

The use averages were based upon a 16-week period. The trail data was recorded from early May - early August, 1994. The boating and fishing use was based upon information recorded from May 20 through early September, 2000. The amount of use will vary about 5-20% each year.

Table 2-5 North Umpqua Wild and Scenic River Comparison of Adjusted Total Numbers of Boaters 1996-2000
Middle North Umpqua 5th Field Watershed

Type of Use	1996	1997	1998	1999	2000
Noncommercial Adjusted Use	3,998	4,702	4,647	4,502	4,311
Commercial Reported Use	2,148	1,994	2,008	1,905	2,019
Total Adjusted Use	6,146	6,696	6,655	6,407	6,330

Table 2-6 Public Recreation Facilities within Old Fairview Subwatershed

Recreation Facilities shaded=BLM unshaded=County	Recreation Facilities					Service Facilities					
	campsites			picnic sites		Sanitary		water		disposal	
	group reservation	table	fire ring	table	fire ring	vault/ portable	flush	drinking	showers-hot/cold	garbage cans	grey water sumps
Susan Creek Campground	no	31	31	no	no	no	yes	yes	yes	yes	yes
Susan Creek Picnic Area	no	no	no	yes	yes	no	yes	yes	no	yes	no
Susan Creek Boater Access *	no	no	no	no*	no*	no	no*	no*	no	yes	no
Susan Creek Falls	no	no	no	yes	yes	yes	no	no	no	yes	no
Smith Springs Wayside	no	no	no	yes	yes	yes	no	no	no	yes	no
Stick Beach	no	no	no	yes	no	yes	no	no	no	no	no
Baker Wayside	no	no	no	yes	yes	yes	no	no	no	yes	no
Hill Creek Wayside	no	no	no	yes	yes	yes	no	no	no	yes	no
Hill Creek Fishermen Footbridge	no	no	no	no	no	no	no	no	no	no	no
Cable Crossing Wayside	no	no	no	yes	yes	yes	no	no	no	yes	no
Swiftwater Day Use	no	no	no	yes	yes	yes	no	no	no	yes	no
North Umpqua Trailhead	no	no	no	yes	no	yes	no	no	no	yes	no
Swiftwater Park	no	no	no	yes	no	no	yes	yes	no	yes	no

None of the sites have RV hook-ups for public use. There are no waste dump sites for RV users within the watershed.

*Although the Boater Access site has no facilities of its own, the facilities from the adjacent Susan Creek Picnic area are used.

Table 2-7 Access to Recreation Facilities within Old Fairview Subwatershed

Recreation Facilities	Access Facilities				Other	
	parking	trailhead	angling	boating	interpretive signs	swimming
Susan Creek Campground	yes	yes	yes	no	yes	yes
Susan Creek Picnic Area	yes	yes	no	no	no	no
Susan Creek Falls Parking	yes	yes	no	no	yes	no
Susan Creek Boater Access	yes	no	yes	yes	yes	no
Smith Springs Wayside	yes	no	yes	no	no	no
Stick Beach	yes	no	yes	no	no	yes
Baker Wayside	yes	no	yes	yes	no	no
Hill Creek Wayside	yes	no	yes	no	no	no
Hill Creek Fishermen Footbridge	yes	no	yes	no	no	no
Cable Crossing Wayside	yes	no	yes	yes	no	no
Swiftwater Park	yes	yes	no	no	no	no
Swiftwater Day Use	yes	no	yes	no	yes	yes
North Umpqua Trailhead	yes	yes	yes	no	yes	no

3 VEGETATION

A. Historic Vegetation

1. Fire Regime

The North Umpqua Ranger District in their Middle North Umpqua Watershed Analysis, version 1.0, January 2001 analyzed fire and fuels as part of their report. Information from this report is quite extensive, and will be referenced below.

Fire history is evident in nearly every naturally occurring forest stand in western Oregon. Fire has been the most important disturbance factor in Northwest forests for centuries. Forest structure and species composition is dependant on the frequency and intensity of past fires. Only in recent times has logging and road building replaced fire as the leading disturbance agent.

Fire regimes are a function of fire frequency and fire intensity and are often given fire severity ratings. Fire regimes can change over time and space. A USFS analysis of the watershed for a 150-year period ending in 1946 indicates the Middle North Umpqua watershed had a high severity fire regime in the past. Approximately 49% of USFS lands were impacted by stand-replacing fires. The current fire regime as reported by the USFS is a Moderate fire severity regime with signs of transition to a high severity regime.

The Middle North Umpqua watershed is surrounded by adjacent watersheds, Little River and Steamboat Creek, that are rated as moderate fire regimes. The South Cascades LSRA identifies the northern portion of the watershed as a moderate regime also. A moderate severity regime can be classified as having a complex mix of low, medium, and high severity fires that occur infrequently (25 - 100 years). Generally, more area is impacted by low to moderate severity burns than by high severity fires. Analysis of recent fires (Apple 1987 and Spring Fire 1996) indicates that 76-83% of the area burned at low to moderate-severity. However, high severity fires remain an important disturbance agent in dry Douglas-fir forests (Morrison and Swanson 1990). Aggressive fire suppression had an obvious impact on controlling the damage done by these fires.

The 1914 Oregon State Fire map shows that BLM lands in the Old Fairview watershed had 43% of the area classified as "burned, not re-stocking" indicating high severity fire damage. Many of these fires occurred in the mid to late 1800's and around the turn of the century. Much of the Pacific Northwest was impacted by large fires during the same time frame. This occurred during a time when little or no fire suppression occurred.

Fire suppression and logging activities since 1940 have altered forest stand structure and fuel profiles from historical levels. The ecological role of natural fire has diminished. Today's stands are more dense and forest understory densities have not been kept in check, according to the USFS report. More fuel (increased fuel loads) for the fire is available as stands become more

dense. Coupled with extreme weather conditions (i.e. drought, east wind events, hot and dry summers), fires burning in heavier fuels are more destructive and burn with greater intensity. "Climatic variations are typically accompanied by variations in the frequency and apparent severity of fires....." (North Umpqua Cooperative Watershed Analysis, PacifiCorp, 1998).

2. Fire Occurrence

Fire frequency is based on the number of fire starts in the analysis area. Douglas Forest Protection Agency records from 1967 through 1991 show 26 fires occurred on all lands in and immediately adjacent to the Old Fairview Watershed. Only nine (9) of those fires impacted BLM managed lands. An additional eight (8) fires occurred on BLM lands in the last decade (1991-2000).

Table 3-1 Summary of Fires within the Old Fairview Area, 1967 to 1991

Cause of fire	Number of fires	% of total fires
1. Lightning	11	42%
2. Logging	6	23%
3. Human	7	27%
4. Other	2	8%

Over this 25-year period, lightning was the predominant fire cause (42%), with logging and human causes responsible for the other fires. Lightning occurrence levels or frequency for the BLM lands are considered low to moderate. Because of rapid initial attack by the DFPA, the majority of all fires were confined to less than 1 acre in size. The largest fire was 49 acres on BLM ground resulting from an escaped slash burn. The fire occurrence rate is less than the one calculated by the USFS, at 0.049 fires per 1000 acres per year vs. 0.072 fires for USFS.

3. Fire Risk

The USFS completed a risk assessment based on fire occurrence, fire consequence, and fire hazard cumulating into a risk rating. The risk assessment will be used to identify areas for fuel treatments. Those areas with the highest potential for fire causing damage to high value lands or structures would receive treatment first. Recreation sites, private lands and structures, and old-growth forests would be of primary importance. The Old Fairview portion of the watershed is currently being analyzed for fire risk. Once the risk analysis is completed it will be incorporated into this document.

The USFS risk analysis considered only 5.2% of the forest to be in the high fire risk zone. This fire risk identified areas that were at risk strictly from a fire occurrence, fire behavior and urban

interface aspect. The BLM lands are intermingled with industrial forest lands and private ownership parcels. The area having the greatest consequence from fire would be along the North Umpqua corridor where the urban interface and recreational sites are concentrated.

B. Current Vegetation, Stand Development, Age Classes and Distribution

The following write-up on vegetation is based on existing forest inventory records, recent surveys of natural and managed stands on BLM lands, and the Interagency Vegetation Mapping Project (IVMP). The Organon (Hann, 1995) growth model is used to predict future stand attributes under different management scenarios.

1. Processes: Stand Development

As stated above with the exception of timber harvest, the dominant physical process responsible for changes in forest type is fire. Fire is the major disturbance event that leads to regeneration of the Douglas-fir forest by removing the overstory shade and creating a bare mineral seed bed. If not for naturally occurring stand-replacing fires, this forest would consist predominantly of shade tolerant conifers. The variable fire frequency and intensity results in a mosaic pattern across the landscape of single and multi cohort stands.

Following a major fire event, the openings created are rapidly reestablished with the plants that existed prior to the disturbance. Roots and seeds that survive the fire in the soil sprout and germinate soon after. Adjacent plants shed seed on these areas, and the process of regeneration begins. The progression is not so much a well-defined succession of new plants as it is a reoccurrence of the previously established plants. The length of time required for Douglas-fir to reestablish and dominate is variable and dependent on seed sources and the degree to which the site is occupied by other plants. The age of trees in natural stands is not even, but rather a range that may span 200 or more years. The term *even-aged* does not accurately define most natural stands. A better term may be *a single cohort* and is defined as all the trees that have resulted after a single disturbance event (Oliver et. al. 1990). A *multi-cohort* stand is one where minor disturbance events have created openings in a patch like nature and younger cohorts exist interspersed with older cohorts.

Over the last 50 years, forest development has replaced fire as the dominant disturbance event. Logging, road building and planting have converted much of the old natural forest into young Douglas-fir plantations. Timber harvest and burning over this period to some extent mimicked a major disturbance event, but there are differences. Some of the more obvious differences include: the removal of large trees, the creation of young stands that were much more uniform and even-aged, and the lack of large snags, large defective trees, and large woody debris (LWD), and the creation of a network of logging roads.

Other disturbance events that add to plant diversity include landslides, storms, disease, insects, and climatic change. For the Middle North Umpqua there is no evidence to suggest that any of these events are responsible for the creation of large openings, or major change in plant

communities in the recent past. However, the potential for large scale disturbance and change in plant communities as a result of any of these events certainly exists.

2. Stand Arrangement

The arrangement of stands is dependent on the processes described above, and results in a mosaic of single and multi-cohort stands across the landscape. Private lands are interspersed with federal lands, most notably within the Old Fairview subwatershed. Most of the private lands are managed as tree farms to produce wood fiber on 40 to 50 year rotations. Currently on BLM lands, natural stands are interspersed with younger, managed plantations. Figure 3-1, and Tables 3-7 and 3-8 show the arrangement of stands and acreage by seral stage and vegetation classes based on 1997 satellite imagery (IVMP). Figures 1-6, 3-2, and Table 3-9 show the arrangement of stands and acreage by seral stage and vegetation classes based on BLM forest inventory.

C. Stand Structure Classification and Seral Stage

Structural and compositional characteristics will be used to define three distinct seral stages: early, mid and late. Each of these seral stages contains characteristic structure that can be defined.

Early Seral is the time when the available growing space is occupied and shared by many species of plants. These early plants are sometimes referred to as pioneers, and may be short or long lived. In plantations, these early plants compete with trees and are often removed as part of management. In natural stands, conifers become established and eventually expand to exclude many of the early plants so that eventually competition is primarily between trees. In general, stand age is less than 30 years, and the average diameter of trees is less than 10 inches.

Mid-seral begins when trees and/or other plants have captured all of the available growing space. The area is fully occupied and new plants will normally not invade unless there is further disturbance. The dominant plants are competing with each other for the available growing space, often forming a continuous closed canopy that allows very little light to reach the soil surface. There are fewer understory plants, and shade intolerant trees that are not in a dominant canopy position begin to die out. Compositional and structural diversity is more limited than in the early and late stages. Growing space becomes available slowly as plants die from competition, and the growth rates of trees is reduced.

Mid-seral stands range in age from about 30 to 80 years, and the diameters of trees average from 10 to over 20 inches.

Stand differentiation often begins in the mid-seral stage of development.

In natural stands difference in the age, size, and genetic potential of trees, and the differences in microsite and the abundance and arrangement of other plants, leads towards stand differentiation.

In managed plantations trees are more uniform in size, age, spacing, and genetic potential. Other plants are often excluded as part of management. It is more likely that the trees in these stands will all grow up together and reach a condition where competition between trees results in substantially reduced growth. It probably takes much more time for stands in this condition to differentiate. These are stands where commercial thinning is planned to meet objectives described in the Resource Management Plan.

Late seral is defined as having the following characteristics:

- Deep multiple canopy layers: This characteristic may not often occur in our area because of the nature of Douglas-fir and the frequency of fire. Two or more canopy layers exist after shade tolerant cohorts become established in the understory.

- Diverse tree size, form and condition: Trees are not evenly spaced and may exist in clumps, and tree size and forms are affected by this variable distribution and density. Trees that are open grown typically have large diameter stems and full crowns. Tall, cylindrical stems with narrow crowns are found when trees grow close together. Large old conifers are present. Many of the oldest conifers are fire scarred and hollow, have broken tops, and contain heart and butt rots.

- Canopy gaps and natural openings: Late seral forests contain openings. The degree to which a stand is open, and the size and spatial arrangement of openings depend on the processes that create them. Stand age, frequency and intensity of fire, disease, insects, wind, and soil movement all have an effect.

- Large snags in various stages of decay: Competition, fire, insects and disease are primarily responsible for the creation of large snags. This is probably a highly variable characteristic. Some large snags are present in late seral forests even when fires occur frequently.

- Large woody debris: The processes that create snags also create LWD. The amount that exists may depend on the frequency and intensity of fire.

- Species diversity: Species diversity is high in late seral forests, many of which are difficult to inventory and describe. The late seral stage includes areas of early and mid-seral development interspersed.

Stands 80 years of age and older are considered late seral. These are naturally occurring stands that contain most, if not all, of the characteristics that define late seral forest.

D. Managed and Unmanaged Stands

After regeneration harvest an area is typically planted with between 450 and 650 seedlings per acre. Plantations are maintained to assure survival of at least 150 well-spaced conifers per acre. Pre-commercial thinning is usually required about 15 years after planting. This process was modeled as part of the RMP and is briefly described as follows:

A sample of 10 plantations between 5 and 9 years of age and one replication from a 15-year progeny site were used to calibrate the SYSTUM-1 young stand growth model (Ritchie, 1993). The sample plantations and the progeny site were well maintained to assure seeding survival, but hardwoods and shrubs are still present. This data was used with SYSTUM 1 to generate average stand conditions at age 15 years.

Table 3-2 Average Stand Conditions at 15 years with and without PCT

Species	TPA without PCT	TPA with PCT
DF	598	220
Other Conifer	75	27
Hardwood	7	3
TOTAL	680	250

The stand conditions at age 15 are input to the Organon growth model. The model is used to project stand conditions at age 30, 40, 50 and 60 years with and without pre-commercial thinning.

Table 3-3 Existing Stand Conditions without PCT

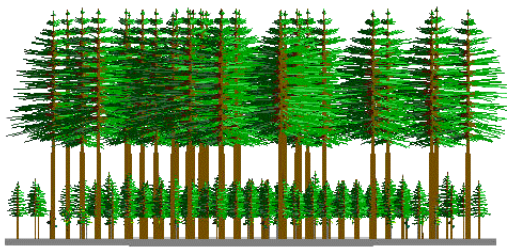
Age	TPA[1]	BA2	VOL3	QMD4	RD5	HT6	CC 7	CR 8
30	641	192	9..3	7.4	71	68	100	49
40	576	253	24.8	9.0	84	91	100	40
50	488	288	42.8	10.4	89	113	100	34
60	403	307	59.8	11.8	89	132	100	32

Table 3-4 Existing Stand Conditions with PCT

Age	TPA	BA	VOL	QMD	RD	HT	CC	CR
30	248	119	6.5	9.4	39	60	110	80
40	246	203	21.1	12.3	58	84	115	61
50	236	265	40.9	14.3	70	106	100	49
60	225	309	63.6	15.9	77	126	100	41

[1] Trees per acre.
[2] Basal area per acre in square feet; the total of the cross sectional area in trees including bark and measured at 4.5' above the ground. Used to explain the area occupied by trees.
[3] Volume per acre in thousand board feet.
[4] Quadratic mean diameter; the diameter of the tree with mean basal area.
[5] Relative density (Curtis); BA./AC divided by the square root of the QMD. Used to define the upper (55) and lower (35) thinning limits. Above 55 and competitive stress causes tree mortality, reduced live crowns, weak stems and roots. Below 35 and the area is not fully occupied by tree species.
[6] Height; total height of the dominant trees in feet.
[7] Crown Closure: the percent of overstory canopy that is closed. Exceeds 100% when limbs are intertwined.
[8] Crown ratio; the ratio of live crowns to total tree height as a percent.

Note in comparing Tables 3-3 and 3-4 that diameters and crowns are larger with thinning. The difference in the trees per acre (TPA) from 30 to 60 years age is mortality due to competition between trees. The following picture of two forest stands at age 80 years reflects the data in the Tables 3-3 through 3-5. One forest stand had pre-commercial thinning at 15 years and commercial thinning at 40 years while the other had none. Note the differences in crowns between a thinned stand as compared to an untreated stand after 80 years of growth.



Pre Comm Thin to 220 TPA, Comm Thin to 40 TPA

Planted with no further treatments

The opportunity to commercially thin both stands exists at about age 40. Either stand would probably benefit from thinning at an earlier age, but in order for the thinning to be commercial there needs to be enough volume. Commercial thinning in the uplands is usually planned to retain between 100 and 120 square feet of basal area per acre, removing the smallest trees first. This normally leaves between 70 and 120 TPA and thinning may be required again in 10 to 15 years to maintain conditions for growth.

Table 3-5 Existing Stand Conditions at age 80

Without Pre-Commercial and Commercial Thinning				With Pre-Commercial and Commercial Thinning							
				Upland Areas				Riparian & Connectivity			
TPA	BA	QMD	CR	TPA	BA	QMD	CR	TPA	BA	QMD	CR
276	325	14.7	28	117	308	22.0	37	71	230	24.3	50

Diameters and live crowns are smaller without commercial thinning. There is a reduction in the amount of dead trees left in the woods with thinning. However, after about age 80 the trees that die are much larger and are considered higher quality snags and LWD.

E. Large Woody Debris and Riparian Reserve Management

1. Riparian Reserves

Riparian Reserves serve several functions in the NFP (USDA, et al. 1994:B-13):

> "...Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed.....provide a high level of fish and riparian protection..."

Riparian Reserves include the riparian area, the aquatic environment, and the terrestrial component immediately upslope. The riparian area is a transition between the aquatic and terrestrial environment where micro climate and vegetation are strongly influenced by the aquatic component. Riparian Reserve widths are based in part on the height of a dominant mature tree. Whether or not a tree will fall and reach the stream is dependant on the distance the tree is away from the stream, direction of lean, and its position on the slope. Riparian and other reserves account for approximately 2,508 acres (11 percent) of the federal ownership in the Old Fairview subwatershed based on mapped streams.

Snags and LWD are a key component of fish habitats and the terrestrial ecosystem within the Riparian Reserves. Habitat formation and maintenance within the stream channel are strongly influenced by LWD. Large woody debris dissipates and redirects stream energy, provides cover for fish, shades the water, and is a source of nutrients in the aquatic system. Large diameters and long lengths are especially important. Large pieces are less mobile during periods of high flow and they persist for a longer period of time. Of the federal Riparian Reserves, approximately

2,335 acres (71%) are considered late seral habitat type and and are expected to have sufficient quantities of LWD and snags (Figure 7-2, Table 3-9).

2. Large Woody Debris

The arrangement and amounts of standing dead and fallen LWD are extremely variable. Fire, insects, and disease kill trees in a random manner which may result in forest stands with more dead wood than live. Quantities reported in the literature for stands in the southern Cascades that originated after wildfires show a wide range of volume and biomass by age class. Table 3-6 is from an article published in *Ecology (*Spies *et al* 1988).

Table 3-6 Volume (m^3/ha) and biomass (Mg/ha) of logs and snags

Stand include young (< 80 years), mature (81-199 years)

Characteristic	**Young**(< 80 years)	**Mature** (81-199 years)
	Volume (m^3/ha), mean/SE	
Logs	**272/46**	**159/20**
Snags	**172/40**	**100/14**
Total	**445/85**	**259/30**
	Biomass (Mg/ha), mean/SE	
Logs	**47/8**	**32/4**
Snags	**36/8**	**23/3**
Total	**83/15**	**54/6**

Timber cruise data from recent regeneration harvests of old-growth stands in the watershed include LWD. For example, within the Right View timber sale down logs in decay class I and II that are 16 inches or greater in diameter and at least 16 feet long averaged 166 linear feet with a range of 54 to 213 feet per acre. Snags 20 inches and greater DBH averaged 2.2 per acre with a range from 1.3 to 3.8 per acre, and snags less than 20 inches DBH averaged 6.5 per acre with a range of 4 to 11 per acre. The total salable volume cruised was 7,200 cubic feet per acre, which is less than the upper level in old-growth of 8,488 cubic feet per acre as reported by Spies. (To convert from cubic meters per hectare to cubic feet per acre multiply by 14.29. To convert metric tons per hectare to tons per acre divide by 2.24).

The cruise data from several sales within the watershed show that there are on average of 85 TPA 8 inches and greater DBH, with a range of 54 to 151 TPA. Of these, 36 TPA are 20 inches and greater DBH with a range of 26 to 50 TPA, and 8 TPA are 40 inches and greater DBH with a range of 4 to 14 TPA. A 40-inch tree that is 12 logs tall with an average form class of 72 has

about 517 cubic feet volume in it. It would require more than 16 trees of this size to equal what Spies reports in old-growth.

All density management treatments will be designed to protect and preserve existing levels of LWD. During and immediately following treatments, stands almost always have trees that are weakened and damaged. Some of these trees will die and some will blow down. Two years after treatment the need for additional LWD will be assessed, allowing for the mortality and blow down that usually occurs following the treatment. If these surveys indicate a need for additional LWD, it can be created from the standing trees and distributed where it is most needed. In time, high quality LWD is expected from stands that have reached 80 years of age.

F. Special Status And Survey And Manage Plant Species

One Special Status vascular plant species (*Phacelia verna*) and two Survey and Manage (S&M) plant species (*Buxbaumia viridis* a moss and *Otidea onotica* a fungus) have been documented in the Old Fairview subwatershed (Table 3-10 and Figure 3-3). In addition, two Special Status vascular plant species and one S&M lichen have been documented within one air mile of the area (Table 3-11 and Figure 3-3). The latest update of the S&M species list in the Record of Decision (ROD) and Standards and Guidelines for Amendments to the S&M, Protection Buffer, and other Mitigation Measures Standards and Guidelines (US Departments of Agriculture and Interior, 2001) was used to determine S&M plant species. Seven plant species that were previously on the S&M list also occur within the Old Fairview subwatershed. No federally or state listed Threatened or Endangered plant species have been documented.

1. Areas of Plant Surveys in the Middle North Umpqua Watershed

There has only been a small amount of plant survey work completed in the analysis area since 1995. Timber sale areas surveyed for plants on BLM lands since 1995 in the watershed are Bit of Honey and a small portion of the Green Thunder Timber Sale. Three small projects (Susan Creek Falls Trail in 1995, Susan Creek Road Reconstruction in 1995, and Toketee Pole Replacement in 1995) have also had plant clearance surveys completed since 1995.

2. Special Status Plant Species That Have the Potential to Occur

The Roseburg District's Special Status plant list was reviewed and species' habitats were assessed to determine the likelihood of their occurrence in the Old Fairview subwatershed. The Special Status plant species that may occur are shown in Appendix A – Botany. The specialized habitats present in this subwatershed having the greatest potential for Special Status plant species are rock outcrops, riparian areas, and wet and dry meadows.

3. Survey and Manage Plant Species That Have the Potential to Occur

A subset of the plant species listed under the ROD and Standards and Guidelines for Amendments to the S&M, Protection Buffer, and other Mitigation Measures Standards and Guidelines (US Departments of Agriculture and Interior, 2001) were assessed to determine their likelihood of occurrence within the Old Fairview subwatershed. All of the 400+ listed plant species were not assessed. Only those species designated as a rare species requiring pre-disturbance surveys (category "A" species) or an uncommon species requiring pre-disturbance surveys (category "C" species) were evaluated to determine the likelihood of their occurrence (Apendix A – Botany). Late seral to old-growth forest stands have the greatest potential for S&M plant species.

G. Noxious Weeds

1. Noxious Weeds in the Middle North Umpqua Watershed Analysis Area

Noxious weeds are plants designated by law as being especially undesirable, troublesome, and difficult to control. Noxious weeds have the ability to out compete and reduce the coverage of native plant communities, decreasing biological diversity, forage production, and land values. Noxious weeds have been introduced and become established on public and private land throughout the watershed. Oregon State Highway 138, which bisects the watershed, provides a gateway for the introduction of noxious weeds. Oregon Department of Transportation (ODOT) treats the sides of Highway 138 by mowing noxious weeds where the highway is on BLM administered lands. Herbicides are not sprayed by ODOT on BLM administered lands due to more stringent environmental regulations.

Within Old Fairview on BLM lands, control of noxious weeds in order of importance are the Wild and Scenic River Corridor, other areas adjacent to natural bodies of water, Highway 138, gravel pits, the transmission line corridor, all right-of-way roads (BLM and private), developed recreation sites (Susan Creek Campground, Swiftwater Recreation Area, and Susan Creek Day Use Area), and all remaining affected public lands.

Eight species of noxious weeds have been documented in the Old Fairview subwatershed (Table 3-14). All eight noxious weed species present are considered "B" list weeds in Douglas County. "B" List noxious weeds are common, well established, and eradication at the county level is not possible. The best management for these "B" list noxious weeds is containment and limiting new infestations from becoming established. A comprehensive weed inventory of the watershed has not been completed. Noxious weeds have been documented from reports and inventories completed for individual projects within the watershed. Diffuse knapweed, Spotted knapweed, Portugese broom, and Common toadflax have not been documented, but have a high potential to occur here. Three of these species (except Common toadflax) are "T" list weeds targeted for control at the county level. If any of these four species were found, intensive control of the infestation would be a high priority.

The priorities for noxious weed control within Old Fairview identified through the limited field work include English ivy infestation at Stick Beach and side bar mainstem river habitat within the North Umpqua. Stick Beach is an informal recreation site within the North Umpqua Wild and Scenic River Corridor, and also the location of an old trespass cabin that was removed by the 1964 flood. In addition, *Buxbaumia viridis* (S&M category D moss) was located at Stick Beach on March 1, 2001. English ivy has the potential to grow over the log where *B. viridis* occurs and displace *B. viridis* individuals. The location of this infestation within the Wild and Scenic River Corridor and the occurrence of the S&M species *B. viridis* are the reasons for prioritizing noxious weed control at this site. English ivy now covers 1.5 acres at Stick Beach. The infestation is primarily located on the south side of Highway 138 with some of the infestation extending north across Highway 138.

The side bar habitat in the North Umpqua River within Old Fairview appears to be a transition area for noxious weeds. Control of this key habitat may prevent the spread of noxious weeds within the river corridor.

- **Cable Crossing Park: Several species of noxious weeds** appear to dominate this relatively small side bar. The parking area has also displaced a portion of the side bar habitat.

- **Hill Creek Wayside, Swimming Hole**: Point bar, across the river from Fern Falls supports **moderately dense population of scotch broom**.

- **Stick Beach: Scotch broom** not nearly as abundant here. Supports a dense population of horsetails.

- **Bob Creek Outlet**: Large, shrub dominated side bar. Flora mostly native, including willow, big leaf maple, alder and Himalayan blackberry. **Small amount of scotch broom** present on far west edge of bar.

2. Areas of Noxious Weed Control

The Roseburg District uses an integrated pest management program, including biological, cultural, chemical, manual, and mechanical practices to control noxious weed infestations. Often more than one of these techniques is used on an infestation. Canada thistle, Bull thistle, Tansy ragwort, Meadow knapweed, Scotch broom, and St. Johnswort are considered common and widespread in Oregon. The primary method of controlling infestations of these species is biological. Biological control agents (primarily insects) have been released and become widespread and well established throughout the Roseburg District. Biological control agents feed on target plants and reduce their ability to spread but very rarely eliminate the infestation. Himalayan blackberry and French broom are also considered common and widespread in Oregon, but biological control agents have not been introduced for these species. Control methods for these species are determined on a case-by-case basis.

The most pervasive noxious weed in the analysis area is Scotch broom. Treatment of roadside Scotch broom infestations is an ongoing annual effort. The Scotch broom shrubs crowd roadsides limiting visibility and may become a safety problem. Documented Scotch broom sites in the watershed have been controlled with manual and chemical treatments. In addition, French broom at Stick Beach along the North Umpqua River was hand pulled in 2000. Approximately 13 miles of roads (32.6 acres) have been treated for noxious weeds from 1995-2000 in the Old Fairview subwatershed (Figure 3-4).

Middle North Umpqua 5th Field Watershed

Figure 3-1

1997 Reclassified Satellite Imagery

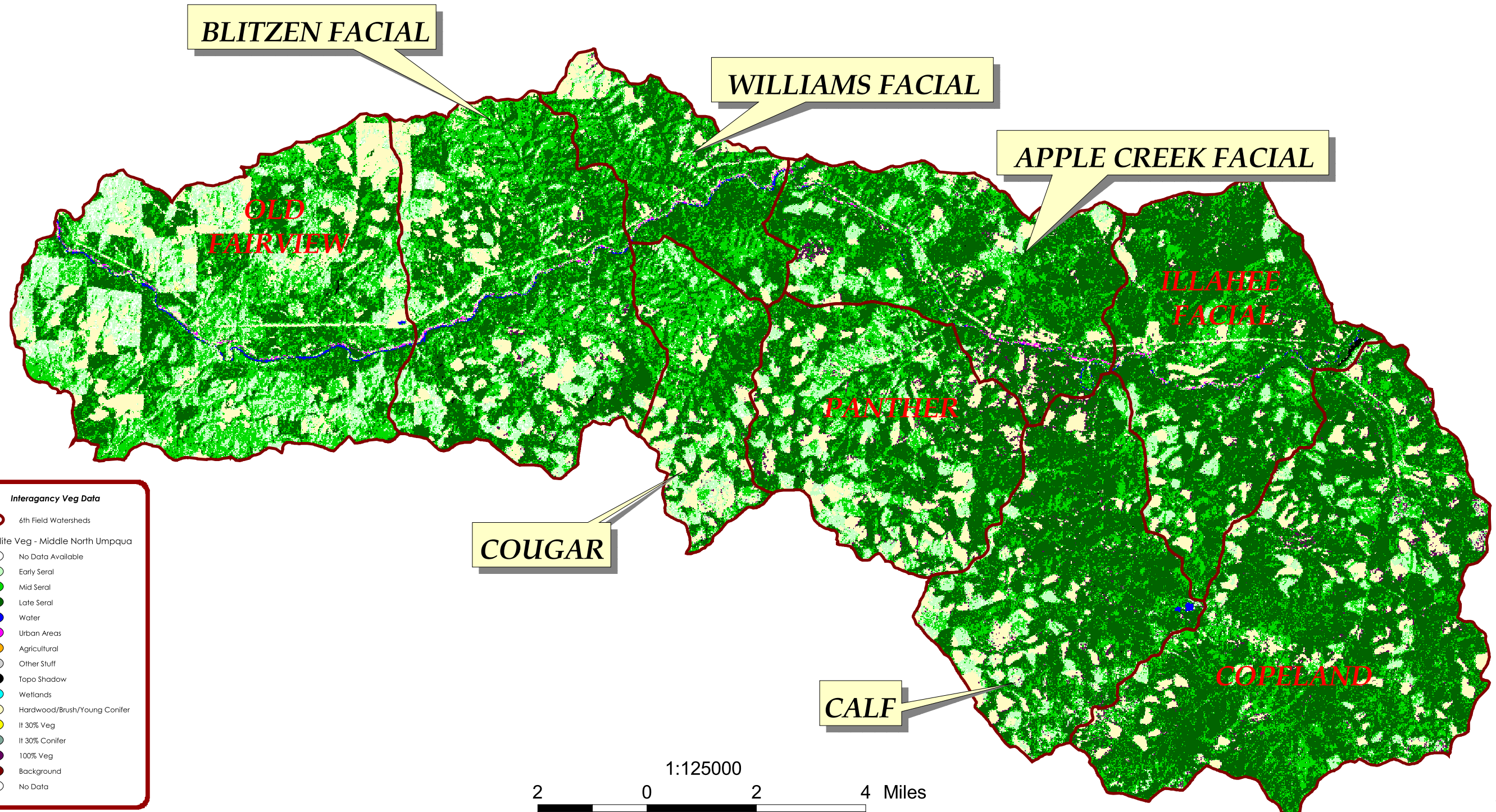


Table 3-7 Middle North Umpqua, 1997 Vegetation

Vegetation Class	COPELAND		CALF		PANTHER		COUGAR		ILLAHEE FACIAL		APPLE CR FACIAL		WILLIAMS FACIAL		BLITZEN FACIAL		OLD FAIRVIEW		TOTAL
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres
Early Seral	1344	5.8%	1113	8.9%	1716	14.1%	873	14.6%	935	6.9%	1062	9.0%	443	6.9%	2054	12.4%	4516	20.6%	14057
Mid Seral	4986	21.7%	2540	20.3%	2884	23.7%	2104	35.2%	2949	21.9%	2984	25.2%	2071	32.2%	5254	31.7%	6986	31.9%	32760
Late Seral	13910	60.5%	7346	58.6%	5429	44.6%	1994	33.4%	8291	61.4%	6237	52.7%	3100	48.2%	6730	40.6%	5862	26.7%	58903
Hardwoods	2124	9.2%	1167	9.3%	1702	14.0%	799	13.4%	1019	7.6%	1087	9.2%	644	10.0%	1818	11.0%	3030	13.8%	13391
Agricultural Lands	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Water	0	0.0%	18	0.1%	0	0.0%	0	0.0%	18	0.1%	25	0.2%	32	0.5%	45	0.3%	104	0.5%	242
Urban Areas	2	0.0%	0	0.0%	0	0.0%	0	0.0%	21	0.2%	40	0.3%	20	0.3%	28	0.2%	54	0.2%	165
Barren/Other	624	2.7%	354	2.8%	435	3.6%	205	3.4%	260	1.9%	398	3.4%	121	1.9%	641	3.9%	1368	6.2%	4406
TOTAL	**22990**		**12538**		**12166**		**5975**		**13493**		**11833**		**6431**		**16570**		**21920**		**123924**

Table 3-8 Old Fairview Subwatershed, 1997 Vegetation – Federal and Private Lands

	Federal		Private		Total
Vegetation Class	acres	%	acres	%	acres
Early Seral Stage (0-30 yrs)	1287	5.9%	3229	14.7%	4516
Mid Seral Stage (31-100 yrs)	3763	17.2%	3223	14.7%	6986
Late Seral Stage (101+yrs)	4992	22.8%	870	4.0%	5862
Hardwoods	1058	4.8%	1972	9.0%	3030
Agricultural Lands	0	---	0	---	0
Water	51	0.2%	53	0.2%	104
Urban Areas	31	0.1%	23	0.1%	54
Barren/Other	293	1.3%	1075	4.9%	1368
TOTAL	**11475**	**52.3%**	**10445**	**47.7%**	**21920**

Old Fairview 6th Field Watershed

Figure 3-2

GFMA and Connectivity Age Classes

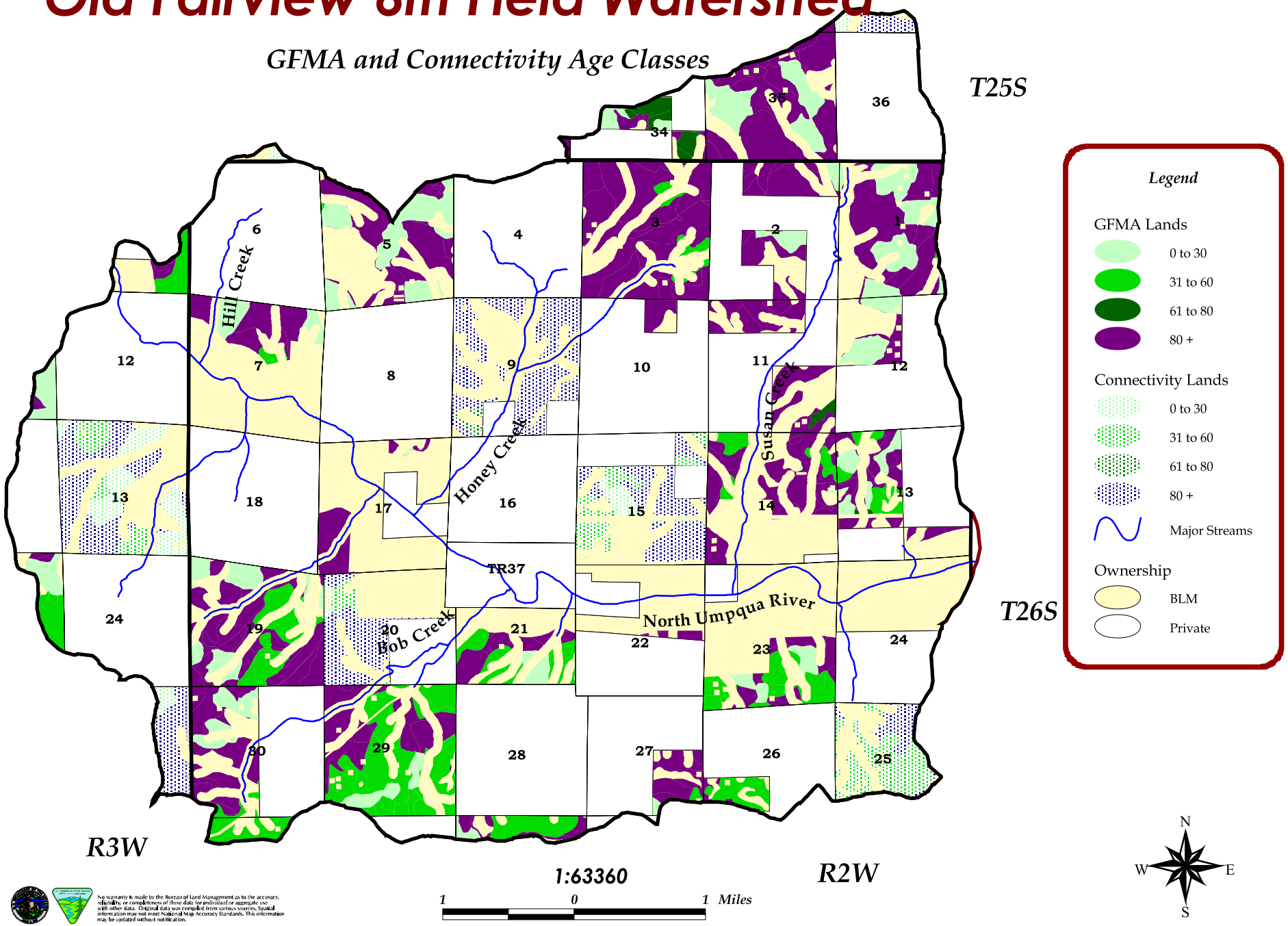


Table 3-9 Old Fairview & Other Subwatersheds, BLM Forest Age Classes by Land Use

Subwatershed	Vegetation Class					
	0 to 30 years	31 to 60 years	61 to 79 years	80+ years	Non-Forest	TOTAL
North Umpqua Wild & Scenic	15	174	0	1822	169	2180
Riparian & Other Reserves	267	552	17	2335	125	3296
GFMA	923	838	60	2637		4457
Connectivity	218	310	12	985		1525
Old Fairview Total	**1423**	**1875**	**88**	**7778**	**294**	**11458**
GFMA	73	45	0	36	4	158
Connectivity	13	59	0	86	20	178
Blitzen Facial Total	**86**	**104**	**0**	**122**	**24**	**336**
GFMA				58		58
Connectivity				22	3	25
Williams Facial Total				**80**	**3**	**83**
TOTAL	**1509**	**1979**	**88**	**7980**	**321**	**11877**

Old Fairview 6th Field Watershed

Figure 3-3

Special Status and Survey&Manage Plant Species located within 1 Air Mile of the Analysis Area

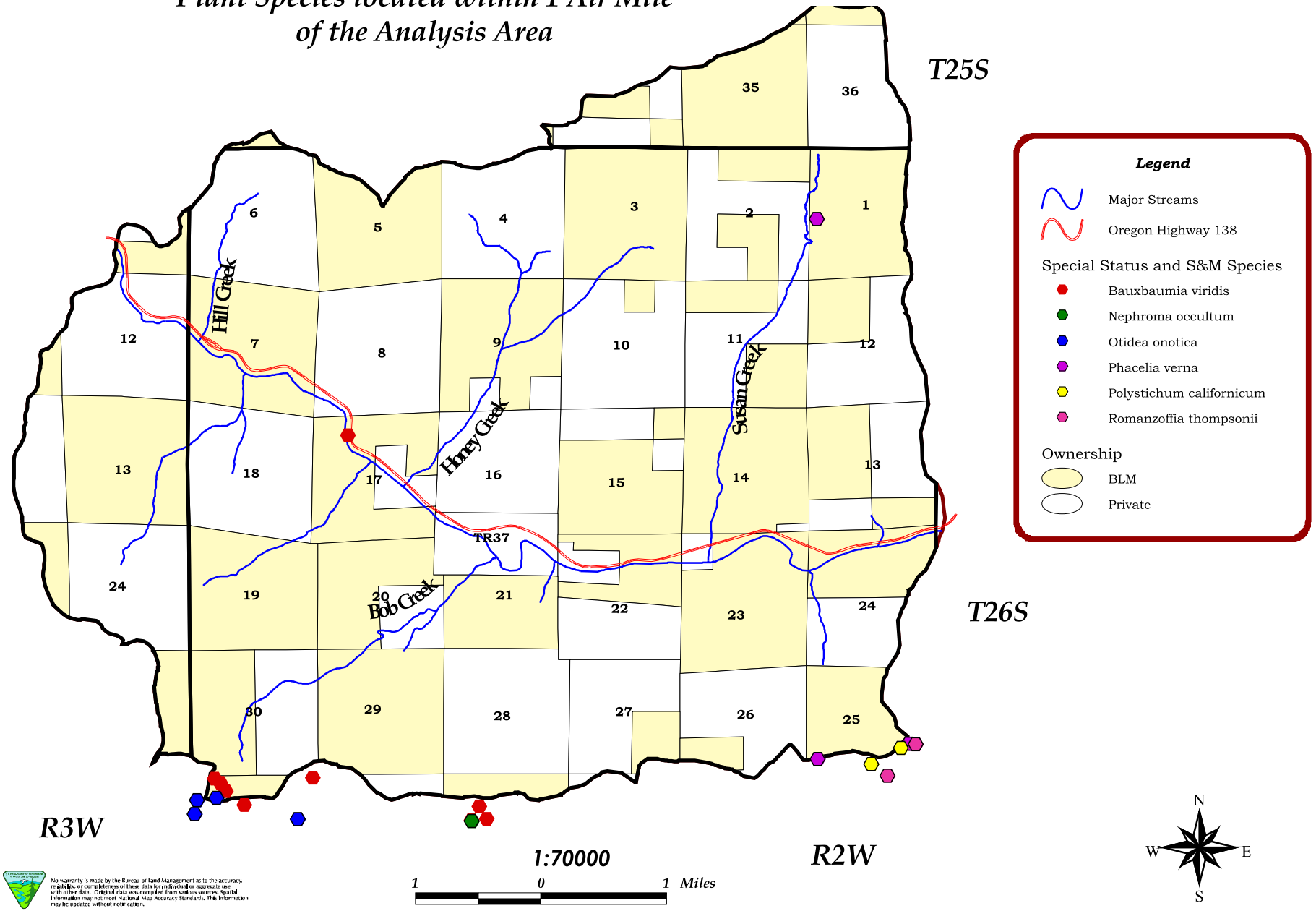


Table 3-10 Special Status and S&M plant species within Mid North Umpqua

SPECIES	NACODE	SITE NUMBER	CURRENT STATUS	ELEVATION	ASPECT	SLOPE	HABITAT
Phacelia verna	PHVE3	OR100_0181	BUREAU TRACKING[1]*[2]	2900	SW	65	Meadow lower to mid slope
Buxbaumia viridis	BUVI2	OR100_1153	D[3]#[4]	2800	S	10	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1154	D#	2800	S	10	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1155	D#	2800	S	10	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1163	D#	820	W	40	Down log, coniferous forest
Otidea onotica	OTON	OR100_1529	F[5]#	2815	SE	10	Coniferous forest

[1] Tracking = Collect information to determine status. No active management required.
[2] * = Special Status Species
[3] D = Uncommon species manage high priority sites and conduct strategic surveys.
[4] # = Survey and Manage Species
[5] F= Uncommon species for which status is undetermined, conduct strategic surveys.

Table 3-11 Special Status and S&M Plant Species within one air mile

SPECIES	NACODE	SITE NUMBER	CURRENT STATUS	ELEVATION	ASPECT	SLOPE	HABITAT
MOSSES							
Buxbaumia viridis	BUVI2	OR100_0036	D[6]#[7]	1700	E	5	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1147	D#	3000	S	60	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1148	D#	2900	S	60	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1149	D#	3100	S	60	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1150	D#	2700	E	10	Down log, coniferous forest
Buxbaumia viridis	BUVI2	OR100_1151	D#	2700	E	10	Down log coniferous forest
Buxbaumia viridis	BUVI2	OR100_1152	D#	2800	S	10	Down log, coniferous forest
LICHEN							
Nephroma occultum	NEOC3	OR100_1156	B[8]#	2940	S	60	Old growth coniferous forest
FUNGI							
Otidea onotica	OTON	OR100_1507	F[9]#	2560	SE	40	Coniferous forest
Otidea onotica	OTON	OR100_1521	F#	2760	SE	25	Coniferous forest
Otidea onotica	OTON	OR100_1522	F#	2840	NW	30	Coniferous forest
Otidea onotica	OTON	OR100_1528	F#	2840	NW	35	Coniferous forest
Otidea onotica	OTON	OR100_1545	F#	2600	E	55	Coniferous forest
VASCULAR PLANTS							
Phacelia verna	PHVE3	OR100_0030	BUREAU TRACKING[10]*[11]	3200	S	5	Small bald on ridge crest
Phacelia verna	PHVE3	OR100_0029	BUREAU TRACKING*	3700	S	20	Bald on ridge crest
Polystichum californicum	POCA13	OR100_0090	BUREAU ASSESSMENT[12]*	3760	S	200	Cracks and crevices in rock bluffs
Polystichum californicum	POCA13	OR100_0091	BUREAU ASSESSMENT*	3200	S	200	Cracks and crevices in rock bluffs
Romanzoffia thompsonii	ROTH	OR100_0154	BUREAU SENSITIVE[13]*	3760	S	20	Moist seeps in balds
Romanzoffia thompsonii	ROTH	OR100_0143	BUREAU SENSITIVE*	3200	S	40	Moist seeps in balds

[6] D = Uncommon species manage high priority sites and conduct strategic surveys.
[7] # = Survey and Manage Species
[8] B = Rare species manage known sites and conduct strategic surveys.
[9] F= Uncommon species for which status is undetermined, conduct strategic surveys.
[10] Tracking = Collect information to determine status. No active management required.
[11] * = Special Status Species
[12] Assessment = Species not federally or state listed but are of concern and may need protection or mitigation.
[13] Sensitive = Species that are Oregon state critical, Washington state sensitive, or Oregon Natural Heritage Program List 1. Bureau actions will not contribute to need to list species.

Old Fairview 6th Field Watershed

Figure 3-4

Weed Treatment Areas from 1995 to 2000

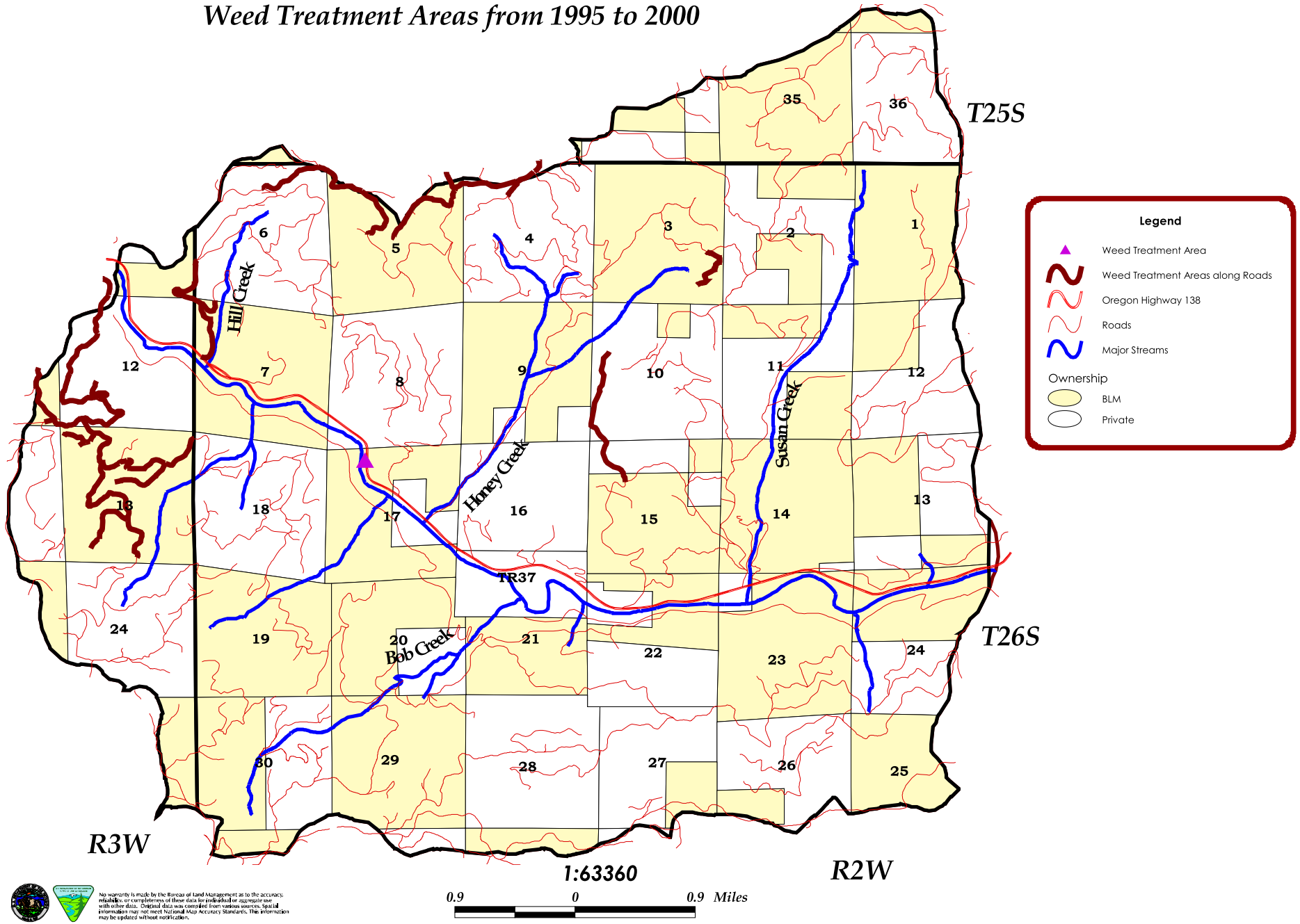


Table 3-12 Documented Noxious Weeds

Family	Species	Common Name
Araliaceae	*Hedera helix*	English ivy
Asteraceae	*Centaurea pratensis*	Meadow knapweed
	Cirsium arvense var. horridum	Canada thistle
	Cirsium vulgare	Bull thistle
	Senecio jacobaea	Tansy ragwort
Fabaceae	*Cytisus scoparius*	Scotch broom
	Genista monspessulana	French broom
Hypericaceae	*Hypericum perforatum*	St. Johnswort
Rosaceae	*Rubus discolor*	Himalayan blackberry

4 WILDLIFE HABITAT AND SPECIES

A. Wildlife Habitat Within Old Fairview

Habitat use by wildlife species found in the analysis unit is not only determined by vegetative composition, structure and age or seral stage, but also the location of the habitat types relative to physical elements. Differences in species occurrence may be found relative to slope aspect, location on the slope or proximity to such features as rivers or small streams. Some species, such as Peregrine falcons are dependent on geological structure (Cliffs) for nesting and on other habitat types to support suitable prey species. Northern spotted owls are dependent on late seral forests to furnish suitable nesting and foraging habitat. Others, such as otters and beaver, are dependent on larger aquatic habitat features. The following descriptions of types of habitat and physical elements are associated with broad categories of wildlife:

1. Riverine Habitat

Within the analysis unit, old-growth forests containing large trees and snags adjacent to the North Umpqua River is one habitat type that is least represented on BLM land in the Roseburg District. The large body of water influences or allows such species as osprey, belted kingfisher, common merganser, canada geese and several species of swallows and bats to forage for their respective prey species or food sources that are supported by the aquatic ecosystem. The adjacent old-growth forest allows most of these species to nest in close proximity of their food source. With the exception of kingfishers which nest in burrows in tall banks, other species listed will nest in large trees on platforms (osprey, geese), tree cavities (swallows, mergansers), and under bark on dominant snags (bats). For the most part, species dependent on large bodies of water nest in habitat zones in close proximity to water bodies. This zone is considered a riverine habitat type. Old-growth forest in the uplands away from the river will not usually be used by species dependent on a riverine habitat type.

For purposes of analysis, a zone from the waters edge extending upslope for 1,000 feet is considered riverine habitat within Old Fairview. Due to the location of the state highway, location of recreation sites, and the amount of disturbance on the north side of the North Umpqua River, this portion of riverine habitat is limited in its value to most native wildlife species that depend on terrestrial habitat elements in the riverine zone.

Within the North Umpqua corridor on the south side of the river, approximately 680 acres of BLM lands and 315 acres of privately owned lands would be considered as terrestrial riverine habitat, given the parameters discussed previously. Approximately 90% of this habitat on BLM acreage is in late seral conifer habitat.

2. Riparian Habitat

Riparian habitats within the analysis area are defined by terrestrial vegetation that is dependent on saturated soil conditions, usually adjacent to a spring, seep, small stream, pond or other aquatic features. Riparian habitat should not be confused with Riparian Reserves as defined in the NFP. Although not common, riparian habitats are found in all seral stages of habitat types within the analysis area. Riparian habitats in shrub/grassland areas are dominated by grasses, forbs, sedges, cattails and willows. Habitats in old-growth or late seral forest are typified by shade tolerant plant species such as skunk cabbage, mosses and ferns. Riparian habitats along streams and small water features within mid-seral conifer forests are typically low in plant diversity in the understory and overstory. Due to the lack of light under closed canopy stands, the riparian mid-seral habitats have the least vegetative diversity and consequently the least vertebrate species diversity of all riparian habitat types.

The amount of potential riparian habitats is further developed in the Hydrology section. With the exception of aquatically influenced habitat in early seral habitat in the transmission line corridor, riparian habitats are changing due to seral stage advancement of the dominant overstory vegetation and consequent changes in riparian vegetation.

Analysis in the vegetation section indicates approximately 14% (743 acres) of Riparian and Other Reserves, as well as the North Umpqua Wild and Scenic River Corridor, are in a mid-seral conifer habitat type. This is the least diverse riparian habitat from both a structural and species diversity standpoint. Approximately 76% of these same land management categories contain late seral forest stands 80 years and older (Table 3-9).

Species such as red-legged frogs and western pond turtles depend on pond type habitats while Dunn's and pacific seep salamanders depend on small, cold streams and seeps in forested areas. Foothills yellow-legged frogs are found on the margins of forested areas in the larger, warmer areas found along the North Umpqua River and Rock Creek. Mammalian species found in terrestrial upland riparian areas include pacific jumping mice, (early seral stage habitats), with shrew-moles and California red-backed voles associated with riparian habitats in older-age forested riparian areas.

3. Early Seral Shrub/Grassland

Within the analysis area, early seral habitats are currently found in natural grass/shrub openings, recently harvested timberlands, along road edges and within the transmission line corridor. Evidence found in established forested areas would indicate that much more early seral or grassland/shrub habitat was available in the past.

Based on observed forest stand structure, many currently timbered areas in the upper one half to one third of the south slope area north of the river consisted of open grass/shrub savannah with large scattered pine and Douglas-fir trees. Typically, stands in this area appear to be even aged, 80 to 120 years old, and contain scattered older trees with an open growth form. Within these

stands there is very little down large woody debris, snags or stumps that would have been present as legacies from earlier stands if the area had been forested. These are further indicators that areas were not forested prior to establishment of the currently existing stands. Fire scars on large older trees indicate recurrent fires moved through the area which would maintain early seral habitats through time. Many of the existing stands of this type have commonly formed due to fire suppression or lack of natural fire, which allows seedling establishment and subsequent survival to a fire resistant age class (Franklin, et. al., 1973, Agee, 1993). Within the current managed landscape, little opportunity exists to replicate past natural early seral habitat types in the analysis area that were the result of stochastic events.

Within Old Fairview, most early seral habitat types are transitory, being created as the result of timber harvest. These early seral stages typically last from 5 to 15 years before conifer canopies close. The time period early seral habitat occupies a site depends on growing conditions for conifers in the harvested areas.

In naturally occurring oak/grass communities that are scattered throughout the upper south slope areas, both Douglas-fir and incense cedar are or have become established, resulting in a gradual conversion of these areas to conifer forest. Without active management or a stochastic event such as wildfire, these natural areas too are transitory, although the process of succession is much slower than on higher quality sites. Over time, conifers become established and out compete oaks and shade out grasses and forbs typical of early seral plant communities found in oak savannah habitat.

Early successional habitat within Old Fairview that is most stable in both acreage and location has resulted from management practices applied to the transmission line right-of-way. The clearing limits for the right-of-way allow creation and maintenance of approximately 210 acres of early successional habitat contained on both BLM and private ownership. This area has been maintained in predominantly shrub/grass/forb habitat since construction in the 1950's. Conditions for wildlife requiring early seral habitat should be maintained throughout the life of the transmission line because of regular vegetation management within the corridor.

4. Mid-Seral Managed Conifer Habitat

Stand development characteristics are discussed in detail in Oliver and Larson, 1996 and Washington Forest Landscape Management Project, 1996, et. al., see references section. The vegetation analysis section of this document also describes the sequential processes involved in forest stand development.

From a wildlife perspective, the closed canopy stage of conifer stands that develops at approximately 20 years of age and continues to stand differentiation is of primary interest. During this phase of stand development, many understory species are unable to establish and residual plants from the previous stand may be lost due to competition from conifers and/or from shading. This leads to a loss of diversity and subsequent maintenance of low diversity levels in plant species composition and structural attributes within the stand. This situation may persist for 80 to 100 years without stand disturbing events.

Due to the simplification of structure and vegetative components within stands, the capability of regenerating stands to support a diversity of vertebrate species is low. (Carey, et.al.). During this competitive phase of growth, conifer stands typically have low crown densities, little understory differentiation and very low plant species diversity within both the overstory and understory. In many, or most instances in the mid-seral stage in managed conifer stands, occurrence of deciduous trees, shrubs, forbs and grasses is very low. This situation is evident both in upland areas and in riparian zones associated with smaller streams.

Lack of deciduous trees and shrubs in both the overstory and understory limit potential for many vertebrate species to occupy and persist in many managed conifer stands. Development of dead limbs and natural cavities occur earlier in deciduous trees than in conifers, thus the potential to support primary and secondary cavity dwellers at an earlier stand age is increased when hardwood components are maintained in stands. Hardwood components also furnish mast and fruit crops that are utilized by both avian and mammalian species. The structure of deciduous trees and shrubs offer nesting and cover for many passerine and gallinaceous bird species. Hardwood trees also furnish natural cavities used by mammals at a fairly early age when compared to conifers.

Due to shading created by closed conifer canopies, understories typically lack forbs and grasses that occur in open canopy stands. This situation results in low or no occupancy by wildlife species that depend on those habitat components. Until canopies are opened due to intraspecific competition during the stem exclusion/understory re-initiation stage, by stochastic events or by management practices, the understories will continue to lack forbs, grasses and hardwoods that could occupy a site, given suitable light levels. Lack of forbs and grasses and shrubs limit the potential to support many vertebrate species that use these plants as cover and food sources. A comprehensive discussion relative to mid-seral closed canopy habitats is found in Hayes and Chan, 1997, see references section.

Canopy structure composition and density within second-growth stands also determine what species of wildlife may use available habitat. Closed canopy stand trees typically have high, thin crowns (low crown to height ratios) where open grown trees may have canopies from the ground to the treetop. Generally, as crowns increase in density, wildlife species respond to the increased cover and increases in leaf area. Increased diameters and structural attributes such as large limbs and craggy bark at earlier stages of stand development favor more wildlife species.

Another attribute of the mid-seral conifer habitat type is the lack of large standing snags and large diameter down woody debris in a majority of the stands. A few of the managed stands in the watershed, especially ones established in the late 1940's and early 1950's, have legacy elements left from the previous forest, however, the majority of existing young stands have little of this legacy element left and do not support wildlife species dependent upon those structures. Recruitment and the process of snag development in mid-seral stands is discussed in Cline, 1977. Wildlife use, particularly avian species, is covered in detail by Mannan, 1977. The vegetation portion of this document also quantifies snag and down wood characteristics of these stands.

5. Late Seral Conifer Forest

Under the current Resource Management Plan, late seral forests are defined as forest seral stages which include mature and old-growth age classes (USDI, June, 1995. pp 106, 112). Mature age classes are those in which trees have reached culmination of mean annual increment to approximately 200 years of age. Old growth consists of "the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again".

For purposes of wildlife habitat in the analysis area, old-growth habitat is conifer habitat that is multi-storied, contains a diversity of tree species in the overstory, maintains a diverse understory vegetation type, contains large diameter snags, large diameter decadent trees and large down woody debris. Stand structure and plant diversity in old-growth forests is high and as a result of this diversity, a high diversity of vertebrate species is present compared to other habitat types. A definition of an old-growth forest, based on structure and composition, is found in Franklin, et. al. July, 1986. Associations of cavity dependent avian and mammalian species are probably the best indicators of old-growth forest in the analysis area. Although spotted owls may, upon occasion, successfully nest and raise young in mid-seral conifer habitat, they primarily select old-growth as their principle nesting habitat.

In the vegetation section of the Fairview analysis, late seral forest is considered as stands greater than 80 years of age in the acreage breakdown. This shows that approximately 7,780 acres (Table 3-9) of stands 80 years old or greater occur in the analysis area. Stands greater than 80 years of age are considered to be naturally derived stands and are not a product of management activity. These natural stands, especially those in the younger age class, may not have developed characteristics of old-growth forest but do have large trees as the dominant structural component and are beginning to produce snags and down material of a size that will effectively support wildlife species normally found in older age forests.

Forest stands begin entering a development stage described as an "understory reinitiation stage," as they mature. The age at which understory begins to develop in stands is highly variable (Oliver and Larson, 1996), however, the result is increasing diversity in both vegetation and wildlife species composition over time.

B. Anthropogenic Influences To Wildlife Habitat

Wildlife species and the habitats they occupy within the boundaries of the analysis area are the result of both natural and human induced influences. Because of easy access, recreational development and use, rural interface with private residences, power-line transmission corridors, highways, timber management road systems and other human influences within the analysis area, wildlife species and their habitat have been both adversely affected and/or benefited by those influences.

Federal Land designations by both the Bureau of Land Management and U.S. Forest Service within the North Umpqua River Corridor have influenced how lands are or will be managed within the analysis area, and subsequently, how wildlife habitat is affected. Along with management of federal lands within the watershed, management of private industrial forest lands has an effect on distribution and occurrence of many species of wildlife.

Analysis and discussions to identify important resource values during the ACEC designation process within the North Umpqua Corridor dropped terrestrial wildlife and habitat within the designation area from consideration. Due to the presence of roads, recreation sites, trails and concentrated human activity, habitat values for terrestrial wildlife on the north side of the North Umpqua River have been affected. Fisheries resources were included as important resource values due to the importance of fish runs in the North Umpqua.

Transmission line corridors and road systems, both major highways and forest access roads, influence wildlife use patterns and impacts to habitat. Forest road systems create linear edge habitats through most habitat types. This allows early seral and edge species to spread throughout the watershed. Intrusion by some species through road corridors may occur into previously limited interior habitats where they might not normally occur.

The transmission line corridor has essentially the same influence as roads, however, due to a different type of vegetation management, early seral grassland/shrub communities are maintained over time. This allows populations of species to persist in the area over time instead of continually pioneering cutover forest lands and then declining as conifers re-occupy the site.

A secondary effect of recreation sites, roads, and transmission lines is the need to cut decadent green trees and snags that pose a danger or hazard to the public or utilities. This is especially notable along the North Umpqua highway and transmission line corridors. On the interior forest road system, cutting danger trees is less of an impact, although snag falling and salvage of down and/or dead trees was a common practice in the recent past and has affected composition of habitat, especially later seral stage conifer along the edges of the road systems. Impacts are less along the recreation trails, however, danger trees and snags have been felled when they were perceived to be a hazard to the public. The principle effect of trails is the increasing amount of disturbance created by human intrusion into areas of otherwise undisturbed habitat. Currently, trees felled due to danger concerns near roads or within recreation management areas are left as LWD. Impacts are less along the recreation trails, however, danger trees and snags have been felled when they were perceived to be a hazard to the public. The following Table 4-1 is an estimate of the amount of categorized area affected by past and present danger tree felling.

Table 4-1 Potential Snag/Danger Tree Reduced Areas

Buffer Type	Land Ownership	Acres
North Umpqua Hwy	BLM Lands	126
(250 ft buffer)	Prvt Lands	113
Transmission Line Corridor	BLM Lands	254
(100 ft buffer)	Prvt Lands	179
Interior Roads (100 ft buffer)	BLM Lands	1287
Susan Creek Trail	BLM Lands	30
(150 ft buffer)		
	BLM Lands	1697
TOTAL	Prvt Lands	292
	TOTAL	1989

Developed recreation sites affect wildlife species and associated habitats in several ways. The most evident is the physical development of the facilities. This alters and displaces habitat and changes environmental conditions on the site. In most instances along the North Umpqua River, facilities have been placed along the river which concentrates human use and presence within the riverine habitat zone. Ancillary to developed facilities, snags, decadent large green trees and other elements that create a safety hazard for visitors are removed. Recreation sites have been developed in most of the larger flat areas between the highway and the river on the north side of the river on federally owned lands. All of this activity and development lowers the value and potential occupancy and use by many wildlife species along this portion of the river corridor. One area within the analysis area that receives the least disturbance is on private property between Smith Springs County Park and the Frontier Store.

Rural interface areas where housing is intermixed with federal ownership is another factor that affects wildlife in the analysis area. On several occasions, dogs have been noted running deer and have killed livestock in the area. Interaction of humans and pets with wildlife in habitats adjacent to private inholdings decreases the value of those habitats to wildlife.

Another aspect is felling of dead trees along power distribution lines that service private dwellings and trees that may pose a threat to those dwellings. Although not on a scale that exists along the major transmission line corridor, snags are removed on a regular basis by power company contractors. Requests are also frequently made for BLM to remove large trees or snags that pose a threat to houses or other facilities.

In some instances, presence of buildings in rural interface areas has a benefit to some species of wildlife. Typically, bats find attics in houses, areas around chimneys and in outbuildings favorable for occupation. Some birds are also drawn to buildings and will nest on ledges and build nests under overhangs. If the animals are tolerated by the property owners, then the wildlife benefit, if not, they may be killed or otherwise eliminated from the property.

C. Federally Listed Threatened Species

Two currently listed threatened species and one recently de-listed species of wildlife, excluding fish, are found in the Old Fairview analysis area. There are no known sites for endangered species in the analysis area on BLM or private lands.

Bald Eagles have been noted using the river corridor on the North Umpqua River and Rock Creek in the winter months during salmon spawning seasons. No incidence of nesting has been noted and the sporadic use would indicate that they are not nesting within the area. Basically, eagles use perch trees along the river corridor or fly up the river to detect spawned out salmon or attempt to take the occasional waterfowl. Bald Eagles have been noted pursuing waterfowl at the ponds on the old Butler ranch in T.26 S., R.2 W., Section 13, just east of Susan Creek. During nesting season and throughout the summer months they are seldom noted along this portion of the North Umpqua Corridor.

Peregrine falcons nest and have produced young within the boundaries of the analysis area. Although peregrines have been removed from federal threatened status, they remain a special status species under BLM directives. There is one currently known eyrie (nest) site located on private lands within the watershed. This site was located in 1993. The pair of falcons from this site is frequently observed hunting grass/shrub habitats adjacent to the eyrie site and along the river corridor. Prey remains located at the eyrie site indicate that they have taken quail, grouse, woodpeckers, waterfowl, seagulls, pigeons and an assortment of passerine birds. Due to the variety of prey species, indications are that they are opportunistic hunters and take prey that utilize every habitat type in the watershed. During nesting season in late spring and summer they are frequently observed on the river just after daylight. They have been observed attempting to capture water ouzels, common mergansers (especially the young) and belted kingfishers in the river corridor. There are two other known eyrie sites on USFS land upriver from and outside of Old Fairview.

Northern spotted owls (NSO) are the most prevalent threatened species in the watershed. Surveys from 1976 through 1995 located 14 nest or pair sites representing 9 pairs of northern spotted owls within the analysis area (Figure 4-1). Seven Residual Habitat Areas (RHAs) containing the oldest habitat contiguous with spotted owl nest sites located prior to 1994 have been designated. RHAs for NSO's are designated Late Successional Reserves (LSR) under the forest plan. Acreages of individual RHAs are illustrated in the following Table 4-2.

Table 4-2 Northern Spotted Owl RHAs:

Site Name	Site Number	Approximate Designated Acres
Hill Creek	0383B	77
Honey Creek	0510	104
Susan Creek	1928	94
Swift Cougar	2152 and 2152B	136
Sams' Pit	1927	109
Smith Springs	2287	109
South Susan	4018	121

Total acres in NSO RHAs = 750 acres, average/site = 107 acres.

Mapped sites that have no designated RHAs were either found after 1994, were the lesser or least used of the sites by the pairs, or were not consistently occupied when they were being surveyed.

Two of the sites, Sams' Pit and No Bridge have been taken over by barred owls. In addition, Sams' Pit was significantly impacted by development of adjacent housing and habitat removal on private lands. One site on the perimeter of the analysis area, Hiatus Creek, has also been occupied by barred owls since at least 1995.

Current status of the NSO sites in the analysis area are unknown as comprehensive surveys were curtailed in 1995-96. In addition to the designated RHAs for NSO's, Critical Habitat for Northern Spotted Owls was designated by the USFWS through a federal register notice on January 15, 1992. (USFWS, 1992). Within Old Fairview, T. 26 S., R. 2 W., contains 15 sections that are designated as Critical Habitat in CHU-27. Table 4-3 gives a breakdown of available habitat, by section and age class. Stands greater than 80 years of age are considered natural stands and furnish nesting, foraging and dispersal habitat for the owls. Stands in the 30- to 79-year age class furnish limited foraging and dispersal habitat and are, for the most part, the result of timber harvest and subsequent management activity. In most instances stands less than 30 years of age are not yet open enough to allow use by spotted owls or are in a grass/shrub habitat type. Stands less than 10 years of age are in grass/shrub habitat and do not furnish habitat for spotted owls. There is no designated critical habitat for spotted owls in the portions of the other two townships that are within the boundaries of Old Fairview.

As noted in the acreage summary (Table 4-3), approximately 1,331 acres of conifer habitat within sections designated as critical habitat are in the mid-seral 30- to 79-year age class. This acreage covers several land use allocations including the designated ACEC within North Umpqua Wild and Scenic Corridor (USFS, USDI, 1992), Riparian Reserves, GFMA, and

Connectivity. Forested areas in this age class furnish little in the way of a prey base or nesting structure for NSO's due to the limited structural and species diversity. Due to the closed canopy nature of the existing mid-seral conifer stands, little stand differentiation can be expected to take place, both in structural attributes and species composition. (Hayes and Chan, 1997).

D. Vertebrate Wildlife Species of Management Concern

Species of management concern is a term used as a designation in this document to highlight vertebrate species that may occur in the Old Fairview subwatershed and are listed by BLM, other federal or state agencies or the Oregon Natural Heritage Program, due to concerns of their continued viability in the state of Oregon or specific counties or provinces in Oregon. There is no legal requirement to manage habitat specifically for species of management concern, as compared to those under the federal endangered species act. Those species that may occur within the watershed are listed in Appendix B – Wildlife. The S&M species list in the Record of Decision (ROD) and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (US Departments of Agriculture and Interior, 2001) lists those species that affect management actions on federal lands. The only vertebrate survey and manage species on the list known to occur within Old Fairview is the Red Tree Vole (RTV) (*Phenacomys longicaudus*).

1. Current RTV Protocol

Under a S&M strategy, S&M species are to be surveyed prior to any ground-disturbing activities. Survey strategy 2 species, which includes RTVs, are to be surveyed for and sites managed if they are found. A ten-acre no harvest buffer is required around established nests found during protocol surveys. Although the species is considered reliant on old-growth conifer forests, they are being found in young and mid-seral forest stands throughout the district.

2. Information on RTV Habitat Survey Results, Nearby Areas

RTVs occur in conifer stands from approximately 15 years of age on better growing sites up through old-growth forest. It is thought the species reaches peak densities in old-growth forests. In the adjacent Rock Creek watershed, RTVs have been found in 15-year old plantations, in 35- to 45-year old second-growth forests and old-growth forests. Most of the animals collected have been adjacent to roads, with the preponderance of individuals being collected in second-growth forests. Locations within the watersheds have usually been at elevations of 1,200 to 1,600 feet. This elevation corresponds to a fog/moisture belt in the Rock Creek area. In other locations, RTVs have been located in habitat patches in which fog usually hangs, especially during summer months. Surveys on the North Bank Habitat Management Area support this observed correlation.

Within Old Fairview, RTVs have been located along the southern edge of the analysis area on Thunder Mountain in the vicinity of Shivigny Lookout, in young stands southeast of the Swiftwater Bridge area, to the northwest above Hiatus Creek, the headwaters of Honey and Hill

Creeks and along the transmission line right-of-way in the Susan Creek drainage. Based on currently known occurrences, these voles are expected to occur throughout the analysis area.

3. Habitat Needs for RTV

Brief searches in the vicinity of active nests located on the edge of stands detected few nests on the interior of the stands that were not associated with small openings. This may be a result of canopy densities found in the dense second-growth stands or the lack of moisture penetration to the interior or both of these elements.
Based on observations by Forsman, Mires, Carey, et. al., this species will occupy stands beginning at the point at which full canopies develop (approximately 15 years of age) and persist in the areas until such time as the crowns thin and trees have low height to crown ratios (approximate age 35 +). At this point, animals and their nests are usually located on edges of small openings or along edges such as those found along road and transmission line corridors. Carey and Forsman surmise that RTV occupation of edge habitat is a result of greater canopy densities found in those locations.

Early work done on the species would substantiate observations of canopy density and moisture availability being two key elements in this species habitat. (Howell, 1926, Bailey, 1936). Clifton, 1960, collected animals for his research from young Douglas-fir stands. He states, "First, it was necessary to locate a dense stand of small Douglas-fir (Psuedotsuga taxifolia)." Continuing, he stated, "These trees would be examined for large nests approximately two feet in diameter. — If tree mouse signs were found, the complete area would be searched, and every prospective nest discovered would be torn apart." Recent field work and discussions with Clifton confirm observations that RTV densities are correlated to canopy density and not necessarily the age of the stands in which they are found. As with observations by other workers, distribution of populations appear to scattered.

Other instances of RTV occurrence in open-growth form trees have been noted. In one roadside tree, seven active nests were found and the boughs were extremely hedged. Other conifers located on the edges of roads have shown the effects of grazing by these mice with almost all of the new growth being removed from the canopy of trees containing nests, resulting in that canopy being noticeably thinner than those of adjacent trees. Clifton, Forsman and others that have maintained captives have commented on the large amount of needles it takes to support individual RTVs (Pers. Comm. 2000, Howell, 1936). This would indicate that canopy densities are important if populations of these animals are to be supported.

4. Forest Managment Conflicts with Current Protocol versus Habitat Needs

Currently, established RTV survey protocols and management of this species greatly limit management of mid-seral stands. This species appears to be ubiquitous throughout most coniferous forest stands. Currently, no harvest buffers around known RTV nest sites prevent active management of those stands for any reason, including improvement for future habitat for RTVs or federally threatened spotted owls.

The occurrence of RTVs in Old Fairview has several implications for management of mid-seral forest stands for wildlife and habitat within the area. Relative to Northern Spotted Owls (NSO), the RTV is one of the principle prey species where it occurs within habitats used by spotted owls. Based on owl pellet data, Forsman has found that RTVs make up from 10 to 40 percent of the prey species of individual owl pair diets in the Roseburg district. (Forsman, pers, comm. 2001). RTVs are also considered a prey species for red-tailed hawks, pygmy owls, and screech owls.

Within Old Fairview, RTVs appear to be widespread and distributed through many habitat types. However, based on casual surveys (not to protocol standards) the species does not appear to occupy many of the closed canopy second-growth stands that are greater than approximately 40 years of age. The desired future condition related to RTVs would be larger crown ratios as shown above in the Vegetation section resulting from thinning mid-seral forests. Unmanaged mid-seral forest stands will develop low crown ratios (see page 36) that will not support RTVs. However, thinning these densely planted stands will allow development of greater crown ratios thus increasing habitat for RTVs. Table 4-3 shows that approximately 1,331 acres of mid-seral age class forests are present in designated spotted owl critical habitat. This developing RTV habitat represents approximately 12% of the federal lands in Old Fairview. Thinning these existing closed canopy stands will enhance habitat for wildlife, including RTVs and other prey species.

Old Fairview 6th Field Watershed

Figure 4-1

Northern Spotted Owl Critical Habitat and Core Areas

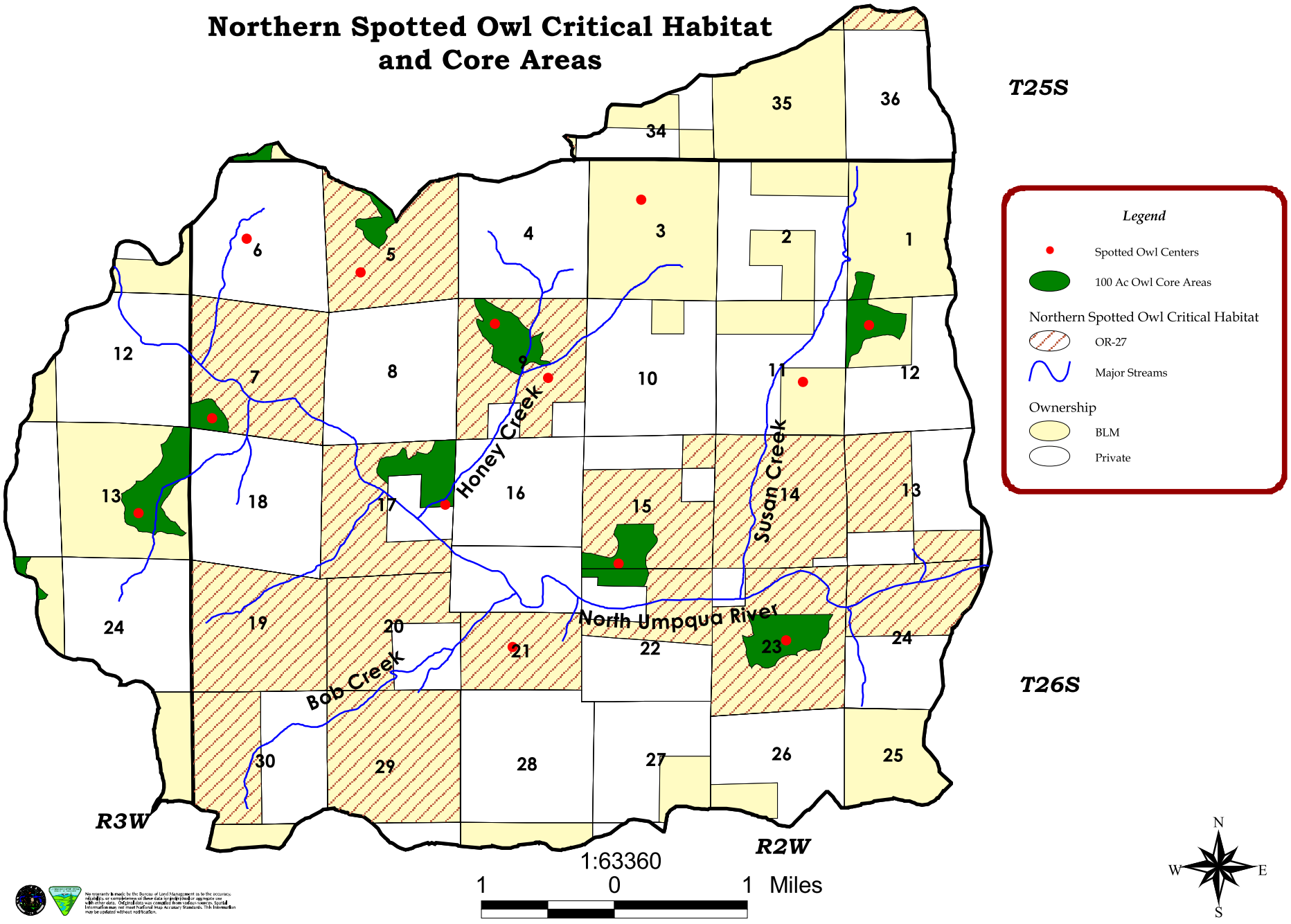


Table 4-3 Habitat Distribution Within Designated Critical Habitat Sections In T26S, R2W

	Forest Stand Age Classes						
Section	Age 80+	Age 30-79	Age 10 - 29	Age 0-9	Non-Forest	Maintained in Transmission Line	TOTAL
5	471	2	223		7		703
7	490	24	67		56	14	651
9	550	13					563
13	192	57		52	3	9	313
14	527	53			44		624
15	326	97		32		19	474
17	435	111			27	10	583
19	332	142	99	22			595
20	294	76	9				379
21	172	132	27				331
22	242						242
23	444	130	53				627
24	276	59					335
29	187	402	9	27	7	9	641
30	217	33	34	32		1	317
TOTAL	5155	1331	521	165	144	62	7378

5 GEOLOGY and SOILS

A. Characterization

Much of the following characterization discussion is taken from the Umpqua National Forest's Middle North Umpqua Watershed Analysis, January 2001. The Middle North Umpqua watershed is part of the Western Cascade Province. The volcanic rock and related sedimentary rock were laid down 17 to 35 million years ago. Within the last three to six million years, tectonic uplift and associated down cutting of streams and mass wasting processes produced the moderately and highly incised mountain slopes of the Western Cascade Province.

The volcanic geology (Figure 5-1) is characterized by ash flow tuffaceous rock (most common rock), andesitic and basaltic lava flows, intrusive masses, and fluvial and mass wasting deposits. The tuffaceous rocks have been altered to varying degrees by metamorphism and hydrothermal activity.

Rapid down cutting caused some mountain slopes to become unstable. Infrequent but very strong seismic events are thought to have triggered slope failures resulting in massive landslides and earth flow complexes of jumbled rock and earth and deep-seated failures involving bedrock that created a stair stepping slump/bench topography on a large scale. The deep-seated failures occurred more frequently in the altered tuffaceous rock. Chemical weathering occurred relatively rapidly in the tuffaceous rock making these formations more incised and unstable. The more resistant basalt flows were cliff formers and were also responsible for much of the more moderately, less incised mountain terrain. Knobs and buttes are remnant features of resistant intrusions. Erosional processes are considerably slower today than the periods of rapid uplift. Figure 5-2 and Table 5-1 gives a good depiction of the topography and the steepness of the Old Fairview 6th Field Watershed. Nearly level to moderate slopes (0 to 60 percent) comprise 86 percent of the total area. (Note: This figure was derived from the topographic map in GIS. Topographic maps tend to somewhat over represent the gentler slopes and somewhat under represent the steeper slopes. The true figure is probably closer to 80 percent).

Table 5-1 Old Fairview Slope Class

	0 to 10%	10 to 40%	40 to 60%	60 to 80%	> 80%	All
Acres	1,930	12,150	4,800	2,280	760	21,910
% Old Fairview	9%	55%	22%	10%	4%	100%

The shallower soils (less than 40 inches of average depth) are concentrated on the upland mountain slopes and scarps and are most typically loamy. Local concentrations of rock outcrop are associated with the shallower soils. The deeper soils dominate the bench, earth flow and alluvial locations and commonly have clayey substratum. Deeper soil are locally common on the upland mountain slopes, particularly where slopes are moderate.

B. Current Conditions

Above normal precipitation and high intensity storms from 1995 to 2000 caused a substantial increase in landslide activity over the early-nineties drought as indicated by the aerial photo landslide inventory done for this watershed analysis. Other forms of erosion also increased. These would primarily be stream channel and bank erosion, road surface erosion, and in-unit surface erosion resulting from timber harvest. Bob Creek and Honey Creek have been identified as the only North Umpqua tributaries in Old Fairview with high levels of turbidity during the 2001 wet season. In Bob Creek, the probable main source of sediment is eight debris flows that originated in the headwaters region in the late1990's. The largest has a run out distance of 3100 feet. Five were harvest related and three were road related. A little further down stream a debris flow occurred in the mid to late eighties. Two BLM road segments that cross Bob Creek and a tributary are experiencing moderate to high erosion.

In Honey Creek, one source of sediment is an inner gorge failure of a main tributary that occurred in the late nineties. This 0.35-acre slide is in old-growth forest away from any road or harvest unit. Where the 26-2-17.0 road crosses this tributary, the culvert is in danger of being blocked by the sediment from this slide. In the late eighties, there were several slumps into Honey Creek along a section of the 26-2-17.0 road. This section has since been bypassed. Currently they do not appear to be big contributors of sediment. All of these Honey Creek slides are within a massive landslide-earth flow complex that exhibits some level of activity as evidenced by these recent slides and tension cracks and recent vertical displacements. Slump displacements cross two segments of the 17.0 road. Rapid landslides in such complexes tend to occur along scarps and incised streams breaking the characteristically gentle to moderate terrain. Since the soils of the landslide-earth flow complexes are very deep and fine textured, even relatively small landslides can be big contributors of sediment. Further up the Honey Creek drainage are a number of problem road segments that cross Honey Creek and its tributaries (see Figure 8-1). They are experiencing moderate to high levels of erosion. A scattering of slumping road surfaces are located in this deep seated landslide-earth flow complex.

The 26-2-22.0 road in the SE Old Fairview has segments that contribute sediment to streams. In one, a stream is captured into a gullied ditch line and emptied into another stream downgrade. Only a scattering of other BLM road segments in Old Fairview have been identified as having moderate to high erosion. Overall, the BLM roads have adequate rock surfacing. Some sediment is produced from these rocked roads, primarily during timber haul.

Stream bank and channel erosion recently has been much less than levels experienced in the fifties through seventies. This is likely due to the better management practices of today and also to stream channel width and depth adjustments, caused by road and harvest related disturbances, having run their course to a new equilibrium (see hydrology section).

Currently, harvest-related surface erosion is not a big factor in stream sedimentation. It locally can be a factor where there are hot prescribed burns on steep slopes or where there is ground-based logging. With BLM thinnings there is high residual tree, slash and understory coverage and there is no prescribed burning. Therefore, surface erosion is expected to be very low with these types of management actions.

Generally, there is a correlation between the amount of precipitation and landslide activity. Landslides are one of the major contributors of erosion and sediment and Figure 5-3 shows the locations of landslides within Old Fairview. The 2001 precipitation year has been well below normal to date. Levels of erosion and sedimentation are substantially less than those levels of the late nineties when precipitation levels were higher.

C. Reference Conditions (late 1950s to present)

Timber harvest in the Old Fairview 6th Field Watershed was well under way by the late fifties. The Swiftwater Field Office has aerial photo coverage of the area starting with the year 1964. The following analysis relies, in part, on the historic record presented in these photos. A landslide inventory covering the period of the late fifties through mid 1999 was the main effort using the photos. Management practices discerned from the photos were also noted. During the first half of this forty-year period, many practices were not as environmentally friendly as today. Common practices and conditions that contributed to higher incidences and magnitudes of landslides and surface erosion were:

a. lower slope and midslope road construction
b. unsurfaced roads
c. sidecasting material on steep slopes during road construction
d. inclusion in sidecast material of woody debris
e. less attention given to good drainage location and design than currently
f. excessively steep grades (greater than 18 percent) on many roads
g. high incidence of logger's choice ground-based yarding. Most of the harvested ground on slopes up to 40 percent were left with a high density of skid trails. Scattered throughout Old Fairview are locations with bladed skid trails on slopes 40 to about 70 percent.

The landslide inventory only picked up landslides that moved rapidly to produce a visible scar on the aerial photos. The depletion zones of these landslides are generally less than 10 feet deep. Deep-seated, slow moving earth flows and slumps are not detectable from the aerial photos. Many of these slump/earth flows are complexes generally greater than 20 acres in size. Late seral forest related landslides and small landslides are also difficult to find with aerial photo

interpretation. For these reasons and others, the inventory is limited and under represents small landslides as well as landslides in forests greater than 20 years of age.

This landslide inventory probably has its greatest value in giving a sense of relative magnitude and impact of the rapidly moving landslides from period to period and from area to area. Chart 5-1 gives a chronology from the late 1950s to 1999 of landslide magnitudes as expressed in acres of landslides per year. The periods represent the intervals between aerial photo flights. By far the greatest landslide activity was from the late 1950s to 1965 (1964 and 1965 flights were combined). Thirty-four percent of the 112 acres of landslides inventoried occurred in the 1965 precipitation year alone, nearly all of which is likely attributable to the December 1964 rain-on-snow event. This was considered a 100-year event. The total precipitation for the 1965 precipitation year was not exceptional (only about 5 inches above the mean). Big debris flows (torrents)/dam break floods and earth flow in the SE portion of Old Fairview accounted for most of the December 1964 event landslide activity. The North Umpqua channel and banks were extensively scoured during that event.

The 1966-70 and 1990-94 periods were the quietest periods, less than one acre of landslides per year. These periods of low landslide activity correlate well with droughty conditions indicated by the Idleyld precipitation record (Chart 5-2). The 1979-83 and 1995-99 periods were the other high spikes in activity and correlated with well above normal precipitation in two or more consecutive years and with long return interval storms. The November 1996 storm in Douglas County was considered a 20-to 25-year event. Correlation between the precipitation record and landslide activity was low for the late fifties to 1964 period (relatively high landslide activity and below normal to normal precipitation). The reasons may be tied with high levels of road construction and harvest occurring in areas particularly sensitive to disturbance.

The identified landslides were broken into size classes based on the combined area of the zone of depletion and zone of accumulation of each landslide (Table 5-2).

Table 5-2 Old Fairview Landslide Categories

Size Class	Size Range	Number of Slides	Total Area in Slides
small	0.03 - 0.10 acres	76	6 acres
medium	0.10 - 0.50 acres	121	37 acres
large	0.50 - 2.00 acres	35	36 acres
very large	2.00 - 5.00 acres	4	15 acres
extremely large	greater than 5 acres	2	18 acres
all slides	0.03 - > 5.00 acres	238	112 acres

Landslides less than about 0.03 acres were not mapped. The 112 acres of inventoried landslides is one-half percent of the Old Fairview subwatershed area.

The relationship between management and landsliding is also shown in Chart 5-1. For the entire 40-year period of the survey, the area in landslides was pretty evenly split between road related (46 percent) and harvest related (42 percent). About twelve percent were forest related (in stands greater than about 20 years of age). The relative amount of forest related landslides is greater than this figure indicates. Most of the forest-related landslides occurred during the December 1964 event. Figure 5-3 shows where the landslides are concentrated in relation to the topography. At least 90 percent have their initiation points on steep slopes greater than 60 percent slope. About 60 percent of the landslides initiated on moisture converging slopes (headwalls, swales, stream channels, concave slopes and hollows). Planar and convex positions accounted for about 40 percent of the total. About 58 percent of all the landslides did not reach a stream, about 30 percent reached 1st and/or 2nd order streams, about 8 percent reached 3rd and 4th order streams and about 4 percent reached the North Umpqua. Included in the four percent of landslides reaching the North Umpqua were the two extremely large debris flows/dam break floods in the SE part of Old Fairview.

Chart 5-2 gives the percent area in landslides (those identified in the aerial photo inventory) for the drainages of Old Fairview. Hogback Creek and Cole Creek drainages are split into north and south of the North Umpqua River due to strongly contrasting differences. This Chart serves as a relative comparison between areas within Old Fairview. The greatest magnitude in landslides were by far in south Cole Ck and south Hogback Creek, hereafter referred to collectively as SE Old Fairview. Despite occupying only 18 percent of Old Fairview, SE Old Fairview contains 35 percent of the medium slides, 43 percent of the large slides and 100 percent of the very large and extremely large slides or 58 percent of the total area in inventoried landslides. One of the very large landslides was the Butte Heights slide which occurred on BLM in 1990. The largest event was a ten-acre debris flow/dam break flood event along the channel of an unnamed creek for 1.4 miles to the North Umpqua. This was likely a December 1964 event. The larger debris flows/dam break floods greatly altered channels, streambanks and riparian zones. Figure 5-3 shows the location of landslides that developed into debris flows and their channel run out lengths.

The drainages with mid-level landslide activity during the 40 year period are Bob Creek, Hill Creek and Honey Creek. Considerable debris flow activity associated with harvest and roads occurred at the headwaters of Bob Creek during the late nineties. A number of large road related landslides occurred in Hill Creek drainage. Recent inner gorge landslides have broken off of an earth flow complex in Honey Creek drainage creating sedimentation into Honey Creek. At the low end of landslide activity are the northern parts of Hogback and Cole Creek drainage and Susan Creek. Table 5-3 gives landslide frequency (number of landslides per 640 acres of land) in terms of management relationships, size and debris flow occurrence. The table demonstrates the distinct difference in landslide frequency between the groupings. SE Old Fairview is substantially greater in all six categories than the other two groupings. Bob, Hill and Honey Creeks' grouping is intermediary in all six categories.

Table 5-3 Landslide Frequency - number of landslides per 640 acres

7th field groupings	In-Unit (harvest related)		Road Related		Debris Flows	
	< 0.5 acres	> 0.5 acres	< 0.5 acres	>0.5 acres	<0.5 acres	>0.5 acres
Susan, N. Hogback, N. Cole Ck	0.90	0.10	1.60	0.10	0	0.10
Hill, Bob, and Honey Creeks	2.40	0.28	2.70	0.73	0.67	0.51
SE Old Fairview	6.40	1.90	4.30	1.20	1.70	1.70
All Drainages combined	2.70	0.53	2.70	0.64	0.67	0.61

The larger landslides with their greater depths had moved large amounts of material relative to the smaller slides. Large (>0.5 acre) road-related slides were more common than large in-unit harvest related slides by a considerable margin in Hill, Bob and Honey Creek drainages. In SE Old Fairview the large (>0.5 acre) in-unit slides were more common than the road related ones.

As shown in the Water Quality, Hydrology, Riparian/Aquatic section (Chart 6-3), there are indications of stream channel and bank scour, sedimentation and deposition associated with higher peak flows over the last 40 years. From the late fifties to the mid sixties, perceptible impacts could be seen along Bob and Honey Creeks in the aerial photos. For the other creeks, impact was much more scattered or not perceptible in the aerial photos. The combination of rain-on-snow events in large clearcuts as well as roads, high-density trails and compaction from ground-based harvesting may have contributed to higher peak flows. Past ground-based harvest practices often used stream channels as skid trails. Considerable erosion would occur as channels reestablished in the compacted swale bottoms. This practice likely occurred in Old Fairview given the high level of past ground-based activity.

The reference condition for undisturbed forest in drought or near normal precipitation years is one of very little surface erosion on the forest floor and annual landslide occurrence thinly dispersed throughout the landscape. Nearly all of these landslides are small to medium in size. Larger forest-related landslides are rare under droughty to near normal conditions. Under well above normal precipitation, high intensity, long-return interval storms, and big rain on snow events, large landslides more commonly occur. Channel and stream bank erosion also increases. On rare occasions extremely large (greater than five acres) debris flow/dam break floods occur.

The December 1964 flood event was likely responsible for the two extremely large debris flow/ dam break flood events in SE Fairview, one of which initiated in old-growth forests. Only small

and medium landslides were detected in old-growth forests outside of SE Old Fairview even though much of these areas were still in old-growth in 1964. Debris flows can have negative short-term effects (fine sediment deposits that need time to work through the system is one example). These debris flows can bring long-term improvements to stream structure including large woody debris and rock fragment incorporation into the lower reaches of fish bearing streams and the North Umpqua River. Under natural forest conditions, large negative short-term effects are normally confined to few areas at any one time, allowing for a large percentage of the 5th field watershed to be in proper functioning condition.

D. Synthesis and Interpretation Erosional Processes and Landslide Hazard

Dominant Erosion Processes: The erosion processes are episodic in Old Fairview. During periods of above-normal precipitation and high-intensity storms, particularly those periods covering two or more consecutive wet seasons, and during significant rain-on-snow events all erosional processes substantially increase. Under prolonged droughty conditions, the opposite effect overall occurs.

Rapid landslides of shallow to moderate depths are generally the biggest erosional process and contributors of sediment to streams during the spikes in precipitation and storm intensities. Roads generally pose a greater risk of larger landslides than in harvest units except for SE Old Fairview. Correction of some stability and drainage problems in old roads and the better road construction and maintenance practices of today have reduced the risks substantially in comparison to the sixties and seventies. Stream channels are greatly altered by occasional large debris flow/dam break flood events. Rapid landslides can break off of creeping segments of the landslide – earthflow complexes, particularly along scarps and the inner gorges of intersecting streams. The Honey Creek landslide earthflow complex has the highest landslide activity compared to other complexes in Old Fairview. Other complexes are mapped in Hill Creek, Hogback Creek, and Susan Creek drainage. They may also be present in the lower elevations of SE Old Fairview. Road surfaces on BLM are generally in good shape. Honey Creek has the highest concentration of problem segments intersecting creeks.

Relative Landslide Hazard: Based solely on the percent area in rapid landslides over the past 40 years, the drainages can be split into the relative risk rankings:

High = Hogback and Cole Creeks south of the N. Umpqua River (SE Old Fairview)
Moderate = Hill, Bob, and Honey Creeks
Low = Susan Creek, Hogback and Cole Creeks north of the N. Umpqua River

Within Old Farivew, Figure 5-3 shows more specifically where the past landslides were concentrated and the corresponding topography. If the initiation points of all the inventoried landslides are superimposed on the slope map (Figure 5-2), the majority would be in the 60 to 80 percent slope range. The slope map then, used in conjunction with Figure 5-3, serves as rough overview where landslides occurred and where future ones could occur in the broad landscape, realizing that average landslide sizes and densities vary greatly among the drainages. Slope maps do not accurately reflect the actual on-the-ground slopes where landslides initiate primarily because of the inaccuracies in the contours and because of the degree of judgment needed in

plotting the initiation points. As a case in point, on-the-ground data from the Oregon Department of Forestry *Storm Impacts and Landslides of 1996* showed that the igneous "red zone" study area of the Western Cascades had the majority of landslides on concave slopes occurring in the 74 to 90 percent slope range and on all other slope positions in the 79 to 110 percent slope range.

Debris flows generally can initiate from receiving landslides in stream gradients as low as 36 percent and can travel until gradients of less than six percent are reached or until stream junction is reached whose angle is less than 70 according to a debris flow run out model developed for Pacific Northwest forest by Benda. Subsequent scour by debris flows, and not the initial volume of the receiving landslide, represents most of the landslide related sediment that is carried into and through stream channel (ODF/OSU. Storm Impacts and Landslides of 1996, p.108).

Drainage Groupings within Relative Landslide Hazard Ratings

SE Old Fairview: The topography where most landslides are concentrated is a stair stepping of steep slopes with shallower soils and localized rock outcroppings and the gently sloping benches with deeper soils. The bedrock is basalt and andesite lava flows. The positions of greatest hazard appear to be steep slopes at:

- a little below a slope break with a bench especially at seeps
- strongly convergent slopes
- steep inner gorges.

High runoff and subsurface flow may be traveling down the steep slopes and collecting on the gentle bench slopes where considerable subsurface water gets stored. The water under considerable head of pressure may daylight as a seep just below the bench on the lower tiers of steep slopes. Where the soil recharge is considerable at seep points, these steep slopes can be highly prone to failure under the disturbance of fire, harvesting and road construction, during exceptional precipitation years or during significant rain-on-snow events. The 1990 harvest-related Butte Height slide (3.8 acres in size) seems to have occurred in this fashion during a below normal precipitation year.

An earth flow of similar size as the Butte Heights slide may have failed for similar reasons in the seventies. A number of the debris flows initiated in headwalls and swales just below these slope breaks. The largest slide was a ten-acre debris flow/dam break flood that initiated in a headwall and had a run out distance of 7,400 feet. A seven-acre slide initiated on a steep slope as a large debris avalanche due to a cut and sidecast failure and developed into a debris flow/dam break flood in the stream channel below. Its run out distance was about 5,000 feet. Both of these failures were apparently December 1964 flood events. Curiously, about 90 percent of the combined landslide area of the 1965 precipitation year, which includes the December 1964 event, were in SE Old Fairview.

Between the basalt and andesite lava flows and the North Umpqua below are deeper soils over tuffaceous rocks and, to a lesser extent, landslide-earthflow complex. Few landslides were identified in this area which is still mostly in old-growth. Not enough information is available to speculate on the reasons for low landslide incidence.

Bob, Hill and Honey Creek Drainages: Stair stepping terrain, incised mountain slopes and the landslide-earth flow complexes are the most common topographic features. The greatest concentration of rapid landslides have been on steep convergent slopes in dissected canyons, on steep slopes just below slopes breaks, and on steep inner gorge slopes. The most common bed rock where failures occurred is tuffaceous rock. All landslides identified in the aerial photo inventory did not exceed two acres in size. Seventy-eight percent of these landslides were less than 0.5 acres in size. The largest debris flow (1.95 acre harvest-related failure) was in the headwaters of Bob Creek and had a run out distance of 3,100 feet. The largest road failures were a deep-seated slump-earth flow caused by road drainage and sidecast loading (1.6 acres) and a cut slope/sidecast failure (1.7 acres). Of the landslide-earth flow complexes, the Honey Creek one has been the most active. Segments of these complexes can become activated with two or more consecutive years of higher than average precipitation. The Forest Service Middle North Umpqua Watershed Analysis identified altered tuffaceous rock as the most common geology for deep-seated failures. Tuffaceous rock is the most common geology in these drainages.

Hogback and Cole Creek drainages north of the North Umpqua and Susan Creek drainage: The topography is similar to Bob, Hill and Honey Creek drainages. The lower incidence of landslides may be partly due to a higher proportion of shallow, rocky, more stable soils on the steep slopes, especially those above 80 percent. Only one debris flow was identified in the landslide inventory. It was about 0.6 acres in size and had a run out distance of 1,250 feet in a tributary of Susan Creek.

Accelerated landsliding caused by management likely left the region in an overall higher state of stability than what existed in the past. This is because much of the sites primed to fail did so under disturbance. The landslide risks are reduced since soil recharge at these failed sites take hundreds of years for instability to reestablish. This fact has important implications for thinnings. The second entries can have considerably lower landslide risks than under the original harvest because of the higher stability imparted by the past failures, because of improved management practices and because of the protective residual stand that remains. However, there could be units where failures initiated but never ran their course to a more stable state. Disturbance could reactivate these unstable sites. A certain percentage of old road segments with sidecast loading still in place on steep slopes pose a threat for future sidecast failures. The 23-6-13.0 road in 26-2-19 is an example. Harvesting of trees growing in sidecast or disrupted road drainage being directed onto them could be future factors in failure. Also, road drainage disrupted in the future by disturbances such as cut slope ravel, cut slope failures, and plugged ditch relief culverts could cause downslope instability where none exist now.

E. Sediment Sources In Streams (Stratified by Degree of Magnitude)

Table 5-5 gives a relative comparison of past and present sediment delivery to streams by drainage. The first three rows focus on past and cumulative sediment delivery while the last three rows focus on sediment delivery since 1994. Cumulative effects are highest for Hogback and Cole Creeks south of the North Umpqua River (SE Old Fairview). Currently, sedimentation is highest in Honey Creek followed by Bob Creek. The main sources are recent debris flows in

both drainages and roads in Honey Creek. Two small, non-fish bearing tributaries of the North Umpqua River in Hogback Creek drainage south of the river may be experiencing sedimentation from the scars of two recent debris flows. Currently, Hill, Hogback, Cole and Susan Creeks have the least sedimentation into streams.

Table 5-4 Relative Magnitudes of Sediment Delivery to Streams

	Old Fairview Drainages					
	Hogback Ck. south of river	Cole Ck. south of river	Bob Creek	Honey Creek	Hill Creek	Hogback & Cole Cks north of river, Susan Ck.
Cumulative debris flow effects	High	High	Medium	Medium	Medium	Low
Effects of landslides- late 1950s to 1994	High	High	Medium	Medium	Medium	Low
Past surface erosion of road prisms/trails	High	High	High	High	High	High
Effects of landslides- 1994 to present	Medium	Low	Medium	Medium	Low	Low
Current surface erosion of road prisms/trails reaching streams	Low/Med	Low	Low	Medium	Low	Low
Current stream turbidity	Low	Low	Medium	Medium	Low	Low

Middle North Umpqua 5th Field Watershed

Figure 5-1

Geologic Formations

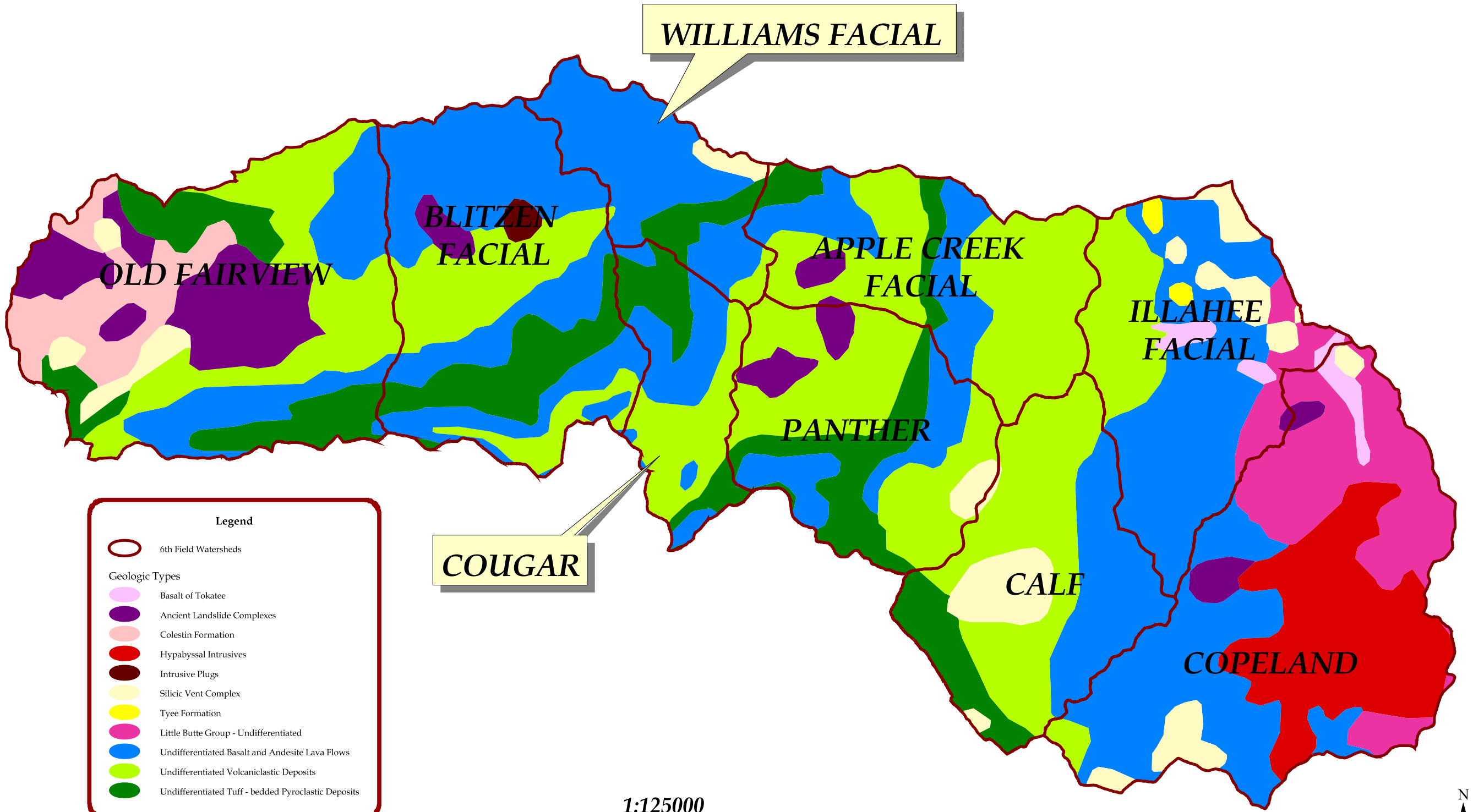
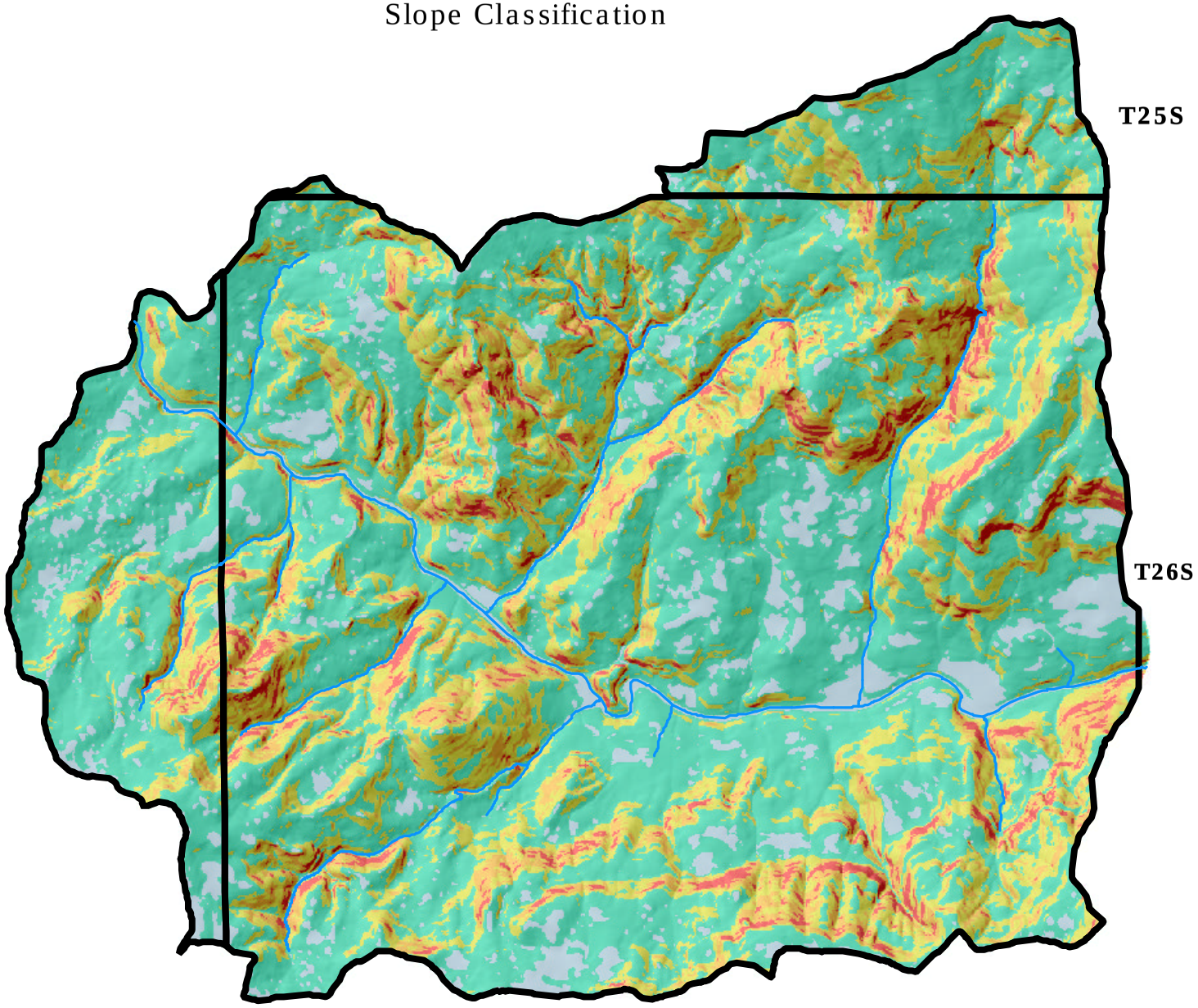


Figure 5-2

Old Fairview 6th Field Watershed

Slope Classification



Legend

Major Streams

Slope Classes

- 0-10%
- 10-40%
- 40-60%
- 60-80%
- 80% +

Township Lines

1:64,575

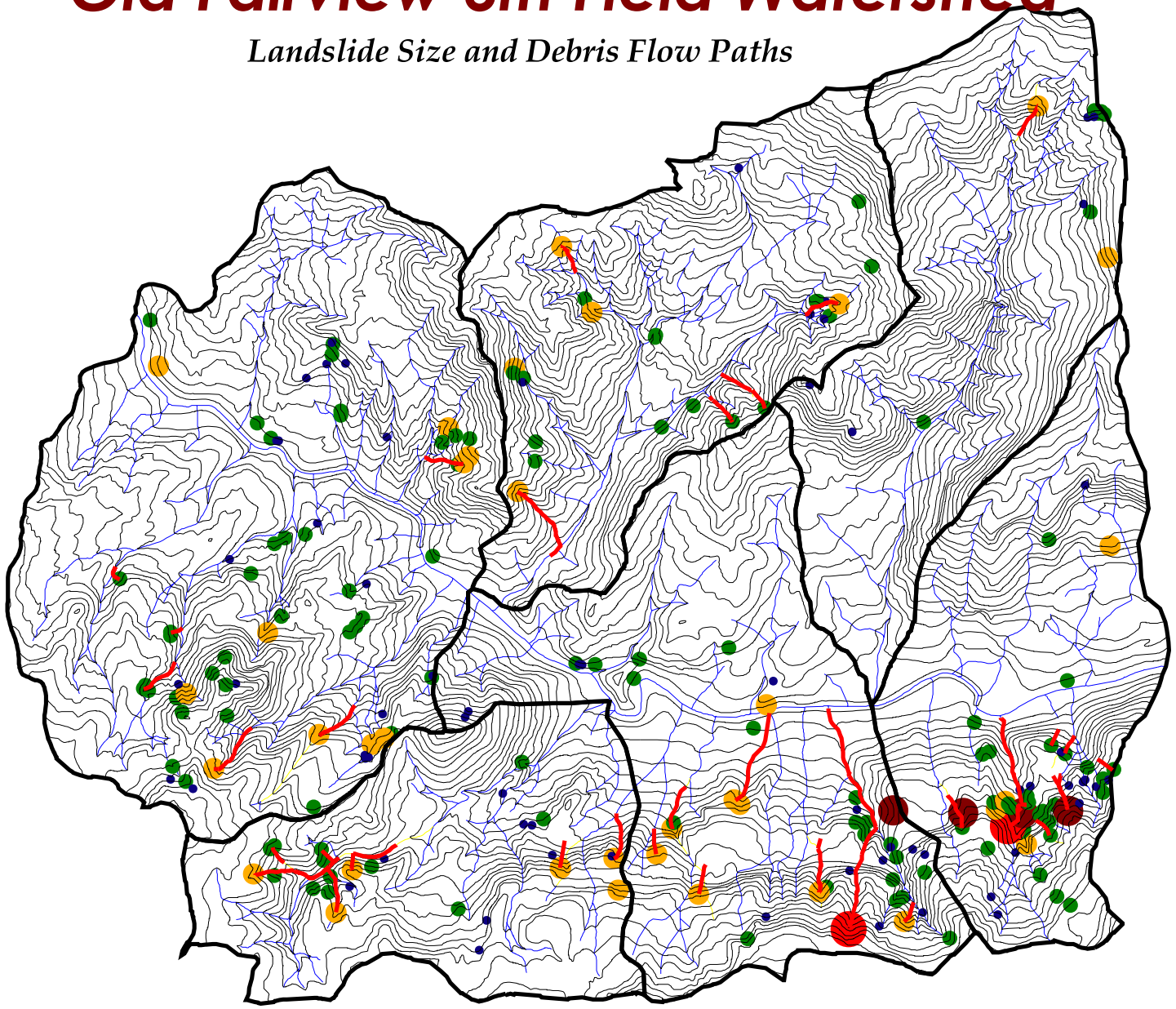
2 1 0 Miles

®

Old Fairview 6th Field Watershed

Figure 5-3

Landslide Size and Debris Flow Paths



Legend

- 7th Field Watersheds
- Streams
- 100 Foot Contours
- Debris Flows

Slides/Flows

- Small (0.03-0.1 Acres)
- Medium (0.1-0.5 Acres)
- Large (0.5-2.0 Acres)
- Very Large (2.0-5.0 Acres)
- Extremely Large (gt 5.0 Acres)

N
W E
S

1:63360

1 0 1 Miles

Chart 5-1 Chronology of Landslide Acres/Year and Management Relationship

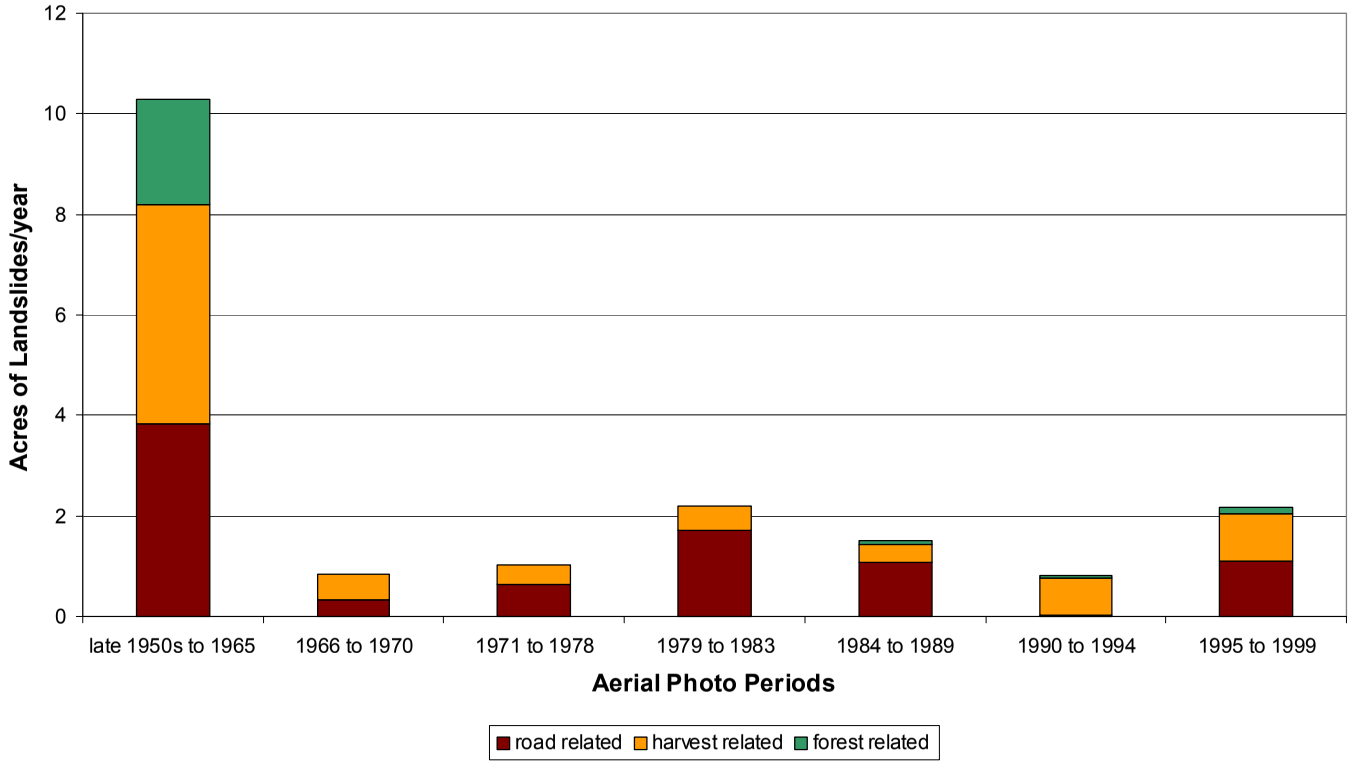


Chart 5-2 Percent of Watershed Drainages in Landslides, 1950 to 1999

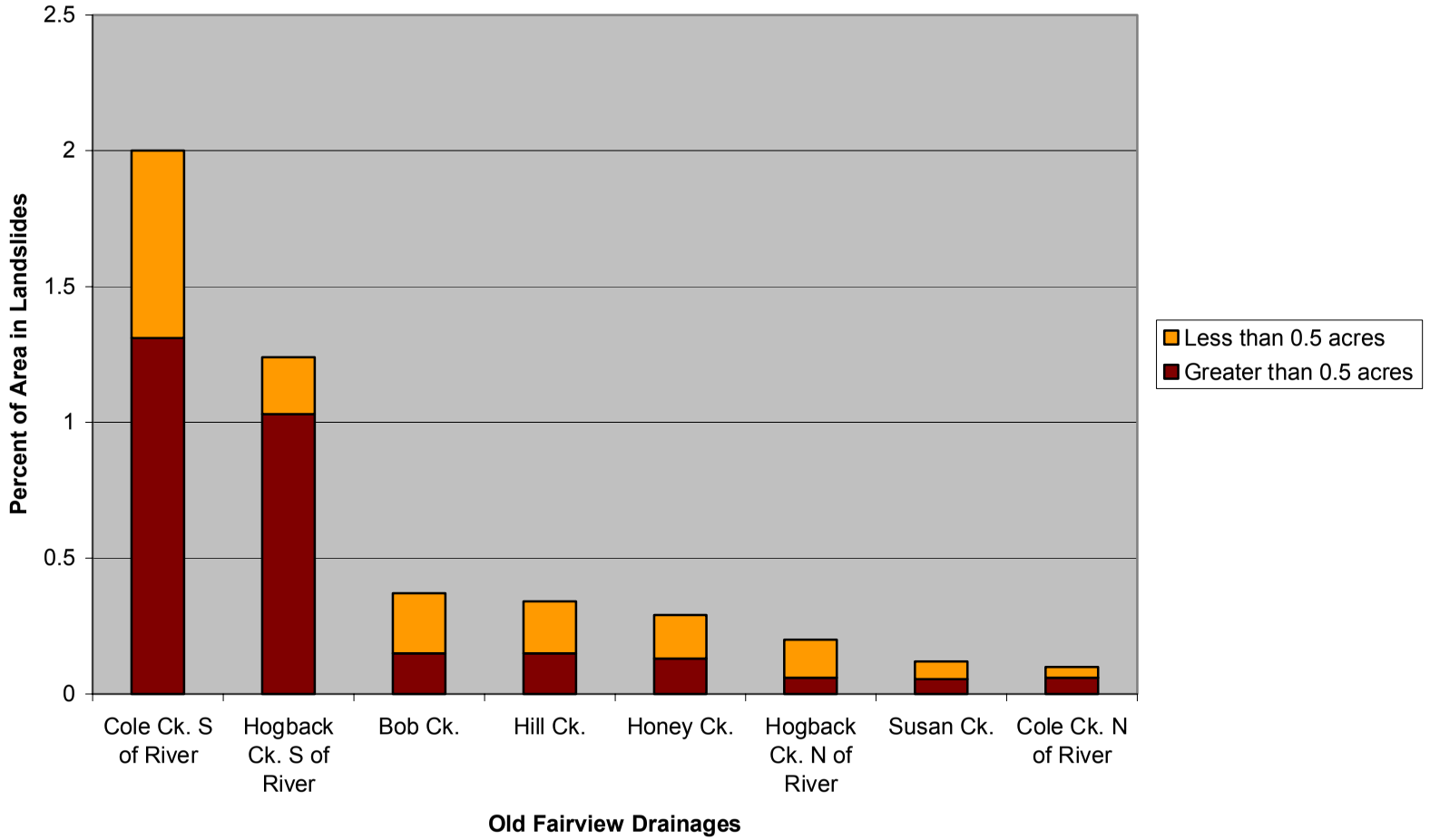
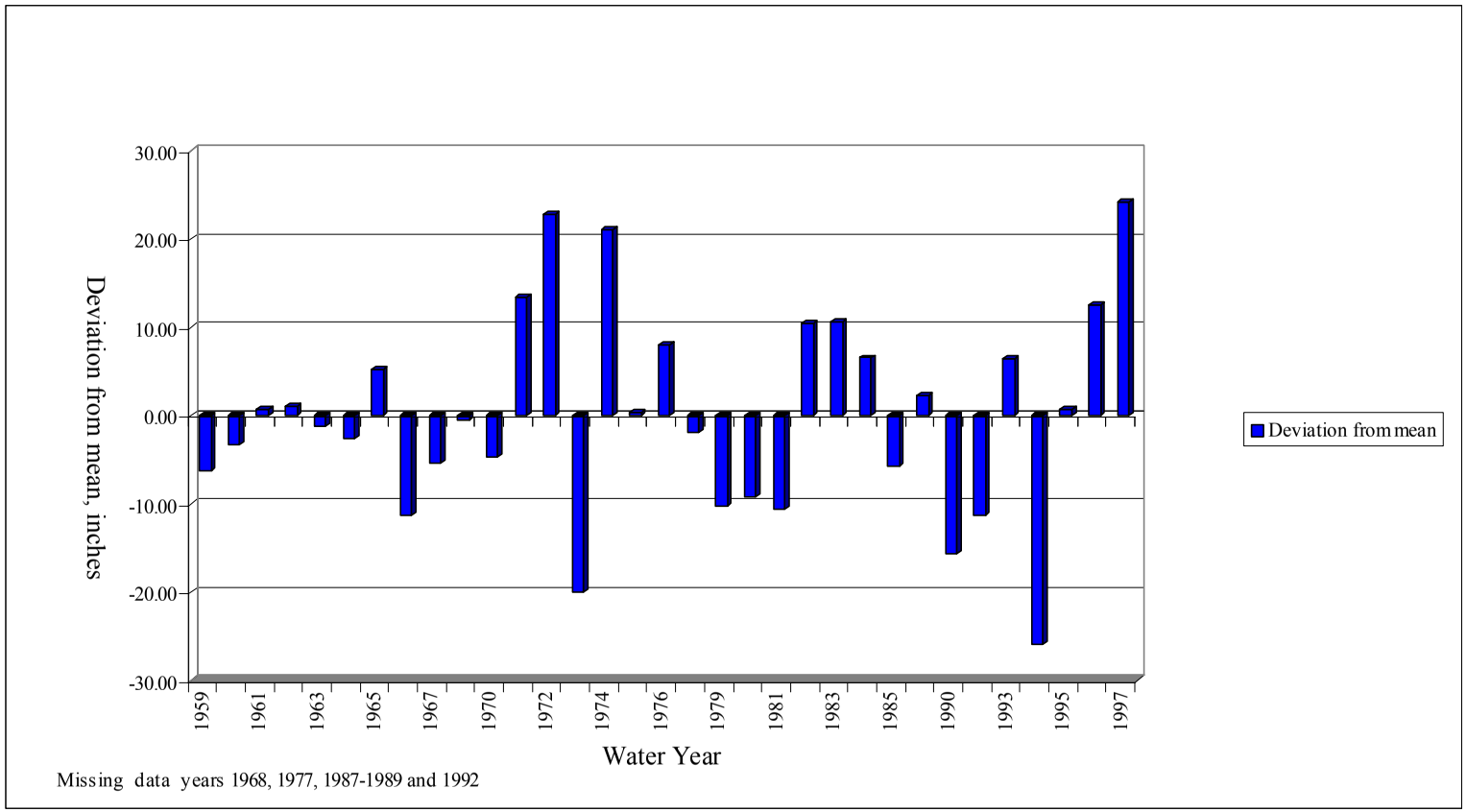


Chart 5-3 Precipitation at Idleyld, OR Weather Station



6 WATER QUALITY, HYDROLOGY AND AQUATIC/RIPARIAN

Middle North Umpqua drains an area of approximately 123,900 acres (~194 square miles), consists of 9 subwatersheds (Figures 1-3 and 6-1), and stretches approximately 27 miles east to west. The 9 subwatersheds from west to east include: Old Fairview, Blitzen Facial, Williams Facial, Cougar, Apple Creek Facial, Panther, Calf, Illahee Facial, Copeland (Figure 1-3, Table 1-1). The Old Fairview subwatershed drains an area slightly larger than 34 square miles, and is composed of six smaller (7th field) drainages (Figure 1-4). Three of these drainages are frontal (Swiftwater, Hogback Creek, Cole Creek) to the North Umpqua River and three are discreet (Bob Creek, Honey Creek, Susan Creek).

A. Water Quality

1. 303D Listed Parameters

The mainstem North Umpqua River and several tributaries within the Middle North Umpqua 5th Field Watershed have been placed on the Oregon 303(d) list due to documented violations of water quality standards (Figure 6-1, Table 6-1, DEQ, 1998a). The affected beneficial uses are resident fish and aquatic life, and salmonid fish-rearing habitat.

Water quality standards for the Umpqua Basin require that the seven (7) day moving average of the daily maximum water temperature shall not exceed 17.8^0 C. A stream is listed as temperature limited when the moving seven (7) day maximum average violates the standard. A stream is listed as flow modified when: (a) "fish species have declined due to water quality conditions," (b) statistical summaries of stream flow based on actual flow measurements show that target instream flows "are not frequently being met," *and* (c) there is an identified "human contribution to the reduction of instream flows below acceptable level indicated." Streams may also be listed as flow modified if multimetric indices indicate that aquatic macroinvertebrate assemblages are within less than 60% of reference community scores (DEQ, 1998b).

Table 6-1 Middle North Umpqua River Stream Listings

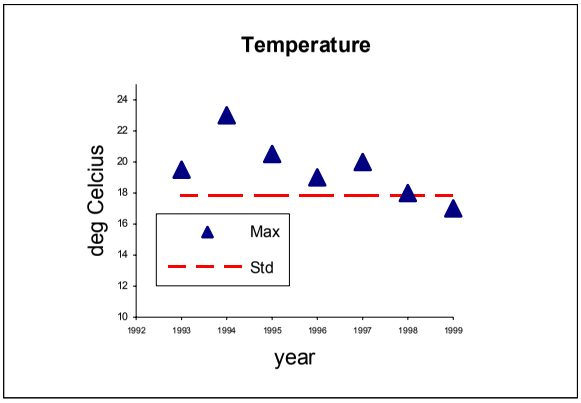
Location	Parameter(s)
North Umpqua River, (Rock Creek to Steamboat Creek)	Rearing Temperature, Flow Modification
Panther Creek 1 (mouth to headwaters)	Rearing Temperature
Panther Creek 2 (mouth to headwaters)	Rearing Temperature
Calf Creek (mouth to headwaters)	Rearing Temperature
Copeland Creek (mouth to headwaters)	Rearing Temperature

2. Stream Temperatures

a) Mainstem North Umpqua

A water quality monitoring station on the mainstem of the North Umpqua just below the Rock Creek confluence has been operational since 1992 (see Figure 6-1). This station reflects the influence of Rock Creek flows mixing with the mainstem North Umpqua. Data indicate that temperatures at this point in the North Umpqua regularly exceeded state standards prior to 1998, but also suggest that temperatures may be trending downward (Chart 6-1).

Chart 6-1 Main Stem North Umpqua Water Quality Station below Rock Creek



b) Tributary Streams

Water temperatures have been monitored in Susan and Honey Creeks for only two years, 1999 and 2000. Honey Creek surpassed the State temperature standard (7-day maximum of 17.8 degrees C) by 0.6 degrees C in 2000 at its mouth. Susan Creek surpassed the State temperature standard in 2000 by 4.2 degrees C at its mouth. Neither stream surpassed the State standard in 1999. It should be noted that the summer of 2000 was an unusually dry summer, which likely resulted in abnormally high stream temperatures throughout the North Umpqua Basin.

Table 6-2 Stream Temperature Summary

Site Name (Legal Description)	Sub-watershed	Period of Record	Max 7-day average	Days over 17.8 deg Celsius	Upstream Drainage Area	
					square miles	acres
Susan Creek (T26S, R2W, Sec 23)	Old Fairview	1999-2000	22	19	5.1	3,270
Honey Creek (T26S, R2W, Sec 17)	Old Fairview	1999-2000	18.4	11	5.2	3,337
North Umpqua Below Rock Creek (T26S, R3W, Sec 1)	Lower North Umpqua	1993-2000	23	Insufficient Data	987	632,218

c) Influence of Land Management Practices and Future Expectations

Stream temperatures vary naturally depending on geographic location and elevation. Temperatures also fluctuate naturally over time with variations in climate and precipitation.

Timber harvest along streams (removal of the riparian canopy) can cause an increase in the solar radiative flux across the water surface and a corresponding increase in peak stream temperatures during the summer, beyond the natural range of variability. Beschta et. al. (1987) demonstrated that complete removal of the forest canopy in the Pacific Northwest can increase the peak daily stream temperature by between 3-8°C during the summer. Removal of the forest canopy may also decrease the minimum nighttime temperature in the winter by allowing more radiative heat loss (MacDonald, et. al., 1991). Recent studies have suggested that changes in channel morphology may also cause stream temperatures to change. Stream temperatures may not return to pre-logging levels until the stream banks become re-vegetated and the input of shortwave radiation is reduced to pre-logging levels (MacDonald, et. al., 1991; Moring, 1975; Holtby, 1988). Current vegetative age classes *for federal lands only* are shown in Chart 6-4.

Stream temperatures in Susan and Honey Creeks are influenced by current conditions of federal Riparian Reserves, practices on private forest lands, and residential properties. Because the majority of the riparian forests within BLM administered portions of the Susan and Honey Creek Riparian Reserves are already late seral (Chart 6-4), stream temperature regimes in Susan and Honey Creeks are not expected to change significantly in the future.

Stream temperatures and other water quality parameters in the mainstem of the North Umpqua are influenced by upstream land use practices, flow regulation at Soda Springs Dam, and by the fact that the North Umpqua Highway has displaced a portion of the riparian canopy. Riparian forests within BLM administered portions of the mainstem North Umpqua Wild and Scenic Corridor are almost entirely late seral (80 years and older forest - Table 3-9), and this condition is not expected to change in the future. Since management of federal Riparian Reserves is not expected to change, it would follow that federal land management will not contribute to the elevated stream temperatures in the mainstem North Umpqua.

3. Flow Modification and Summer Low Flows

The mainstem of the North Umpqua River has been listed under Section 303(d) of the Clean Water Act as flow modified. State listing criteria for flow-modified channels are based on "documentation that flows are not frequently being met" or an "identification of human contribution to the reduction of instream flows below acceptable level."

USGS flow gaging stations are located both above Copeland Creek and just above Rock Creek, near the upper and lower boundaries of the Middle North Umpqua 5th Field Watershed. Log Pearson distributions were used to estimate summer low flows at both stations (Table 6-3). Results indicate that summer low flows in the mainstem North Umpqua change very little between these two stations (between 1% and 3%, depending on the return interval), actually decreasing slightly between Copeland Creek and Rock Creek, probably as a result of domestic and commercial water withdrawals. Steamboat Creek, the largest tributary that enters the North Umpqua between the two flow gaging stations, contributes only between 28 to 37 cfs (between 5% to 6%) to the mainstem North Umpqua during summer low flow. Steamboat Creek is outside of the Old Fairview subwatershed.

Although these estimates suggest that withdrawals may be occuring above Rock Creek, standard errors associated with statistical low flows presented in Table 6-3 are too large to conclude that this is indeed the case. The Bureau of Land Management does not withdraw water above Rock Creek, and the tributaries within Old Fairview do not contribute significantly to the flow in the mainstem. It follows that summer low flows within the mainstem of the North Umpqua are not significantly influenced by federal management activities within Old Fairview or by any of the tributaries within the analysis area.

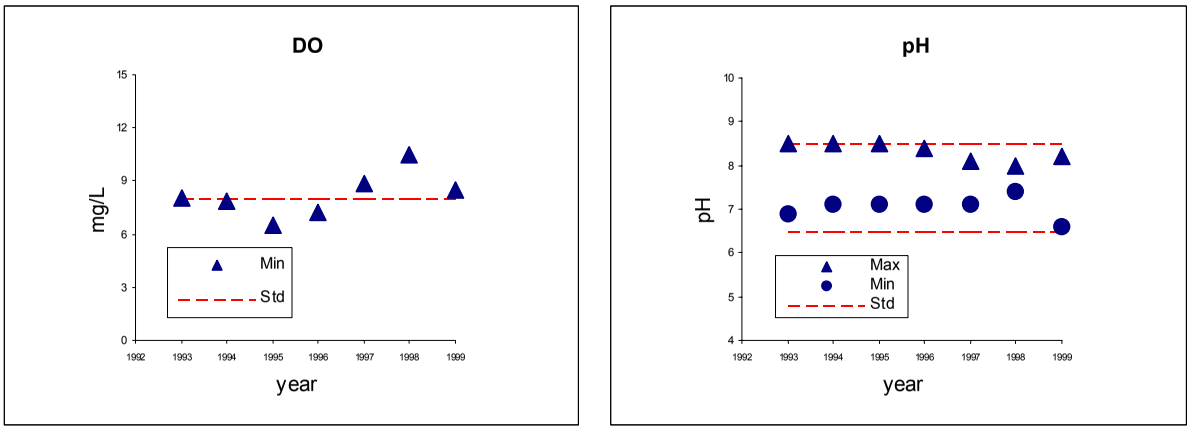
Table 6-3 Summer Low Flow Summary

Steamboat Creek		N Umpqua Above Rock Creek		N Umpqua Above Copeland Creek	
Return Interval (years)	Low Flow (cfs)	Return Interval (years)	Low Flow (cfs)	Return Interval (years)	Low Flow (cfs)
200	28	200	519	200	527
100	28	100	529	100	537
50	29	50	539	50	548
25	30	25	553	25	562
10	31	10	577	10	588
5	33	5	603	5	617
3	35	3	631	3	648
2	37	2	664	2	685

4. Other Water Quality Parameters

USGS data indicates that the Oregon State dissolved oxygen (DO) standard was violated in the mainstem North Umpqua below Rock Creek during 1997, 1998 and 1999 (Chart 6-2). Currently, there is no reason to believe that tributaries within Old Fairview have caused a significant increase in the organic loading and biological oxygen demand (BOD) within the mainstem river. Factors that may contribute to a lowered concentration of water column and/or intragravel DO include natural variations in temperatures and summer low flows, and changes in the flow and sediment supply regime resulting from upstream flow regulation, landsliding, and/or management-related activities. No violations of state standards for pH have been observed at this site (Chart 6-2).

Chart 6-2 Mainstem North Umpqua Water Quality Station below Rock Creek: pH and Dissolved Oxygen



Honey Creek was sampled just below its lower east fork for turbidity on September 20, 2000, during a minor (less than 2-year) storm event. Water samples indicated a turbidity in the creek of 21 NTU. By contrast, the turbidity in the lower east fork tributary to Honey Creek was 54 NTU. The high turbidity in this tributary was attributed directly to the earthflow/landslide complex just upstream (see Figure 5-3). The turbidity just above the earthflow/landslide complex was not measured during the storm event, but was observed to be low (less than 20 NTU).

B. Stream and Riparian Habitat

1. Mainstem Habitat

No information concerning the distribution or condition of instream habitat units within the mainstem North Umpqua is currently available. Major side bar and overbank floodplain habitats were mapped during the month of February 2001 and are listed below. Most side bars and overbank floodplain terraces along the mainstem, below the Susan Creek confluence, have been impacted by noxious weeds.

North Umpqua Side Bar and Floodplain Habitat

Cable Crossing Park: Several species of noxious weeds appear to dominate this relatively small side bar. The parking area has also displaced a portion of the side bar habitat.

Hill Creek Wayside, Swimming Hole: Point bar, across the river from Fern Falls supports moderately dense population of scotch or french broom.

Baker Wayside: Most of this side bar is occupied by a campground.

Stick Beach: Scotch broom not nearly as abundant here. Side bar supports a dense population of horsetails, however.

Bob Creek Outlet: Large, shrub-dominated side bar. Flora mostly native, including willow, big leaf maple, alder and Himalayan blackberry. Scotch broom present only in small patch on far west edge of bar.

Lower Smith Springs: Large side bar, island, and secondary channel (see picture below). Located on privately owned land. Another small point bar is located on directly opposite on the south bank of the river.

Lower Smith Springs Island, Side Bar and Secondary Channel

Susan Creek Campground, Island, Side Bar and Secondary Channel: Large side bar, small mid-channel bar and secondary channel. Side bar is dominated by large, dense populations of various non-native plants, particularly Meadow Knapweed, Himalayan Blackberry, Trefoil Birdsfoot, and Everlasting Pea (see area outlined in yellow below). Some French Broom is also present. The mid-channel bar currently appears to be populated primarily by willow.

Susan Creek Outlet Island, Side Bar and Secondary Channel

2. Tributary Habitat

a) Distribution of Instream Habitat

The hydrologic regime, together with stream valley characteristics (valley gradients, side slopes) and debris flow history are the most important determinants of stream geometry and habitat characteristics in lower order (higher elevation) streams. In higher order (lower elevation) streams, sediment supply and riparian vegetative characteristics can strongly influence channel dimensions and channel planform. Old Fairview is dominated by steep, narrow valleys and

highly constrained, lower order stream channels. Most of these channels are colluvial, and not significantly influenced by large woody debris (LWD).

Higher order alluvial and semi-alluvial stream habitats were identified as those areas with recognizable floodplains, generally Rosgen type B or C channels (entrenchment ratio regularly exceeds 1.4), where gravels begin to accumulate and distinct instream pool and riffle habitats begin to form (Figure 6-2). These stream segments are most likely to be structurally dependant on large instream wood. Known alluvial and semi-alluvial stream and riparian habitats are listed in Table 6-4.

Table 6-4 Alluvial and Semi-alluvial Stream Segments

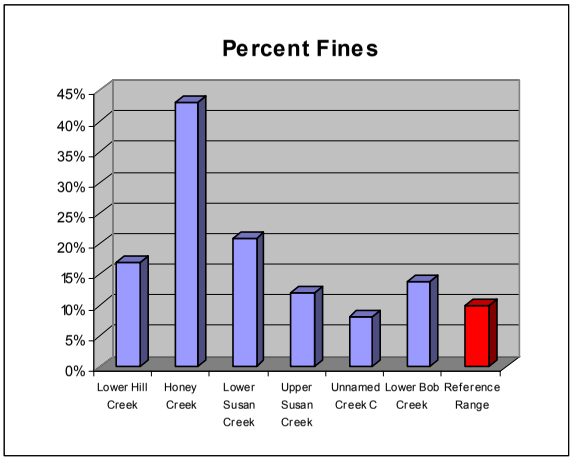
Stream Name	reach length (mi)	average width (ft)	average floodprone width (ft)	average entrench-ment ratio
Lower Hill Creek	0.3	39	49	1.3
Honey Creek	1.5	22	27	1.2
Hogback Creek	0.2	unknown		
Lower Susan Creek	0.7	33	37	1.1
Upper Susan Creek	1.1	28	31	1.1
Unnamed Creek A	0.4	unknown		
Unnamed Creek B	0.2	unknown		
Unnamed Creek C	0.7	30	52	1.7
Lower Bob Creek	0.6	37	110	3.0
Upper Bob Creek	0.7	unknown		

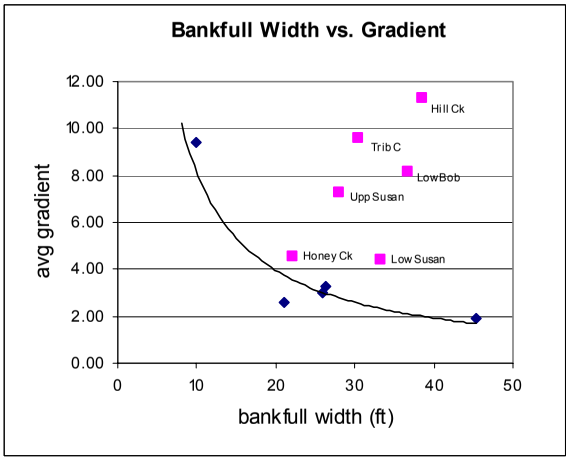
b) Condition of Instream Habitat

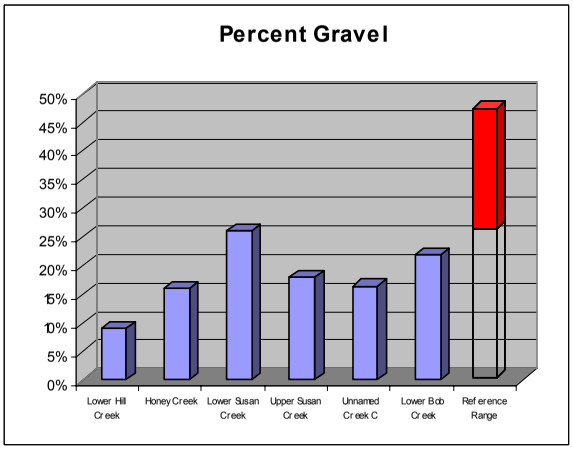
Because natural instream habitat characteristics vary depending on local channel gradient, valley characteristics, and other variables, reference sites are often used to define desired conditions within a given watershed. Reference stream catchments are generally defined as unmanaged catchments with little or no historical harvest or development, and very little road coverage. No suitable reference streams were identified within the Middle North Umpqua 5th Field Watershed. Several suitable reference streams were located within the upper portion of the Canton Creek watershed, however. These include Lost Bucket Creek, McKinley Creek, No Man Creek, and two reaches along the mainstem of Upper Canton Creek. These streams together represent the range of stream gradients and bankfull widths found within the major streams of the Old Fairview WAU, and were, therefore, deemed acceptable reference streams. Selected habitat parameters for these streams are graphed in Chart 6-3 (red bars and blue dots/solid lines) and compared to those streams within the Old Fairview WAU for which habitat data is available. Results indicate that most to all of the major tributaries within the WAU are deficient in gravel and large wood. Most to all major tributaries are also wider, on average, than reference streams

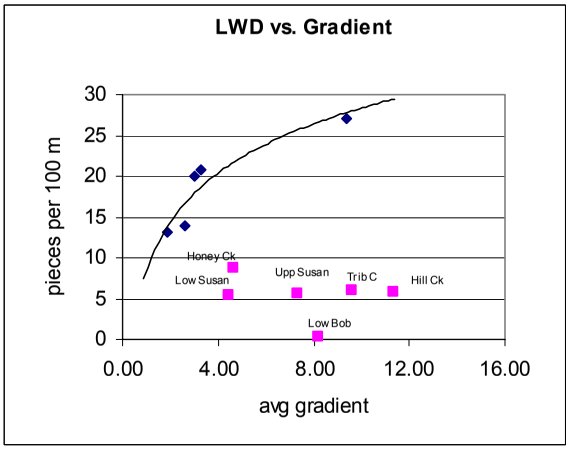
of similar gradient. All of the streams in the WAU that are shown above also have a higher percent fine sediment than do the reference streams, with the exception of Unnamed Creek C.

Chart 6-3. Instream Habitat Metrics: Comparison with Reference Condition









Other available habitat data are summarized below in Table 6-5. Instream habitat data for Susan, Honey, Upper Canton, Lost Bucket, McKinley and No Man Creeks were obtained from ODFW Habitat Inventory records (ODFW, 1993, 1994). Other data were collected by BLM personnel using methods similar to those employed by ODFW.

Table 6-5 Instream Habitat Summary

Stream Name	% pools	LWD /100m	riffles		undercut banks
			% fines	% gravel	
Lower Hill Creek	12	6	17	9	
Honey Creek	15	9	43%	16%	1%
Hogback Creek	------	unknown	------		
Lower Susan Creek	5	6	21%	26%	0%
Upper Susan Creek	5	6	12%	18%	0%
Unnamed Creek A	------	unknown	------		
Unnamed Creek B	------	unknown	------		
Unnamed Creek C	14	6	8%	16%	---
Lower Bob Creek	23	1	14%	22%	3%
Upper Bob Creek	------	unknown	------		

Average stream widths are often related to the level of large wood and gravel retention in lower gradient perennial (alluvial valley) stream segments (Dose and Roper, 1994). Because these stream types are the most likely to benefit from habitat enhancement activities, the stream segments listed in Table 6-5 are examined below in greater detail.

Lower Hill Creek

Hill Creek flows through a steep, colluvial ravine between 2000 and 1550 feet (distance above mouth). The substrate in this reach is dominated by boulders. The creek levels out below 1550 feet, with the riparian corridor widening to approximately 50 feet. Below this point, the creek exhibits a step-pool type morphology, with pools comprising approximately 12% of the wetted length. The alluvial cobble/boulder dominated riffles include approximately 10% gravel, and 20% fine material. The creek passes under Highway 138 between 190 and 95 feet. Although there is little suitable salmonid spawning habitat, this creek appears to be fish passable during moderate to high flow.

Hill Creek shows the greatest departure from reference of any stream surveyed, both in terms of its bankfull width and large wood content.

Honey Creek

Although the streambanks have apparently stabilized, the lower portion (1.5 stream miles) of Honey Creek is steeply incised and channelized, with an average bankfull width of only 22 feet. About 500 feet above the mouth, the floodplain is as wide as 200 feet, and yet the active channel is only about 25 feet wide. The bed surface is highly embedded with a very high silt fraction.

Riffles contain an average of 43% silt and sand (ODFW, 1993). Large silt deposits have been observed up and down much of the lower part of this creek. Two landslides, one on the lower east tributary to Honey Creek, and one above the lower east tributary, are primarily responsible for the fine sediment deposition observed within this reach.

Turbidity was measured in the lower east tributary and in Honey Creek below the lower east tributary during a moderate storm event that occurred on September 20, 2000. Water samples from the lower east tributary contained 332 mg/L suspended sediment, with a turbidity of 54 NTU. Water samples collected from the mainstem of Honey Creek contained 476 mg/L suspended sediment with a turbidity of 21 NTU. The landslide on the lower east tributary (just above the Honey Creek Road crossing) nearly plugged the culvert running under Honey Creek Road during the fall and early winter of 2000, in the absence of any major flood event.

The North Umpqua floodplain historically extended up into the lower portion of Honey Creek, but has been disconnected from the river by Highway 138. Parts of that floodplain, most of which is located on private land, appear to be at least seasonally wet. Honey Creek Road runs through the lower half mile of the Honey Creek floodplain. A large portion of the lower floodplain appears to be hydrologically disconnected from the stream channel.

Above the lower block of privately owned land (about river mile 1.1), Honey Creek appears to be confined within a moderately steep, colluvial valley.

Hogback Creek

Highway 138 is a fish passage barrier to upper Hogback Creek. The 0.2 mile reach of Hogback Creek below Highway 138 appears to be alluvial and to contain potential salmonid spawning habitat. No other information is currently available concerning Hogback Creek.

Lower Susan Creek

The lower 0.7 miles of Susan Creek are boulder and cobble dominated, with riffles containing an average of 21% fines and 26% gravel. The average pool-riffle ratio is 0.2 (ODFW, 1994). The lower portion of the stream also appears to be somewhat incised. The low pool-riffle ratio can probably be attributed in part to the relatively low frequency of large woody debris in the stream (6 pieces per 100 meters on average for the entire reach, about half of it contained in a single log jam about 1500 meters upstream from the mouth).

Wet areas were noted to the north of Highway 138, across from Smith Springs Wayside and within the vicinity of Susan Creek (Figure 6-4). These areas (mostly on private land) appear to be part of the former North Umpqua floodplain, disconnected from the river by Highway 138.

Upper Susan Creek

The upper semi-alluvial portion of Susan Creek (see Figure 6-2) is dominated by cascades and rapids. Riffles within ODFW survey reaches 3 and 4 (ODFW, 1994) comprise only about 7% of the instream habitat, and contain an average of 12% fines and 18% gravels. Pools are infrequent

(only 4%). Large instream wood is again relatively infrequent, averaging only 6 pieces per 100 meters.

Unnamed Creek A

A short, 0.4 mile reach of non-fish bearing, semi-alluvial habitat was identified in Creek A (photo, below). No habitat data are currently available for this reach. The substrate is boulder and cobble dominated.

Unnamed Creek B

No habitat data are currently available for Creek B.

Unnamed Creek C

The substrate of tributary C is dominated by cobbles and boulders, with the riparian corridor averaging about 50 feet in width. Riffles contain about 8% fines. Pools comprise about 14% of the habitat. LWD frequency averages 6 pieces per 100 meters for the whole reach, but is higher (about 8 pieces per 100 meters) above the North Umpqua Trail. The riffle substrate is composed of between 20 to 30% gravel, with the exception of a steep, 300 to 400-foot reach directly below the North Umpqua Trail crossing which has been scoured down to bedrock. The North Umpqua Trail crosses Creek C at a distance of 1300 feet above the creek's mouth. Above the North Umpqua Trail, the creek corridor widens to a maximum flood prone width of 90 feet. The channel above 1300 feet exhibits some of the characteristics typical of moderate to low gradient alluvial channels, including meanders, secondary channels, and mid channel bars.

The riparian corridor of Creek C appears to contain a higher percentage of late seral forest than any other low gradient tributary in the Old Fairview WAU.

Lower Bob Creek

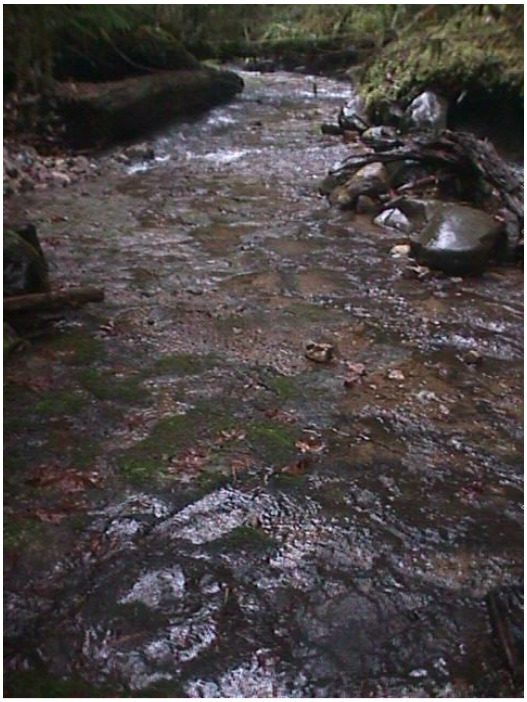
The lower ½ mile of Bob Creek is a relatively low gradient, alluvial, fish-bearing stream. Three coho salmon carcasses were located in the lower portion of Bob Creek during a recent field survey in January of 2001. Gravel retention in this reach is moderate to low for a stream of this size, probably due to an almost complete lack of large instream wood. Although aerial photos do not show any evidence of recent debris flow activity, large cobble and boulder deposits below the mouth of Bob Creek suggest that Lower Bob Creek may have experienced a debris flow within the last 50 to 100 years, perhaps originating in the relatively steep segment of Bob Creek lying between one-and-a-half to two miles above the mouth. Harvest activity along the streambanks and within the riparian zone has prevented any further large wood recruitment in the lower portion of Bob Creek.

Upper Bob Creek

Within Old Fairview subwatershed, the riparian corridor of Upper Bob Creek (see Figure 6-2) is a unique patch of unharvested riparian habitat. Obligate and facultative wetland flora are generally absent here, however, perhaps because the valley floor is well drained and/or sloped just enough to lower the water table and prevent lower frequency floods from saturating much of the flood prone area and perhaps, in part, because the channel has been disconnected to some extent from its floodplain by previous debris flows. Although much of the reach is incised, pockets of relatively clean gravels and cobbles were observed in January of 2001 (see photographs below). This reach is not fish bearing due to a series of waterfalls farther downstream.

Upper Bob Creek, Middle North Umpqua tributary. Much of this reach (just above BLM road #20.1) was apparently scoured down to bedrock in the early 1980's, probably as a result of log removal and/or a landslide originating in the harvest unit directly upstream. Although the stream is incised, the channel and floodplain have reconnected in places due to an abundance of large trees, newly recruited LWD, and resulting aggredation of the stream bed.

Small debris jam is effectively trapping gravels and cobbles, creating potential habitat for macroinvertebrates and the amphibians that feed on them.



Further downstream, evidence of a debris flow is still apparent where the stream has been scoured down to bedrock. Gravel has failed to accumulate here, probably due to a lack of large wood in this section.

Just below the upper harvest unit, a new logging debris jam has formed.

Looking downstream from debris jam. The log jam has trapped a large volume of sediment upstream. A dam break could result in another debris flow.

c) Distribution and Condition of Riparian Habitat

The Roseburg District RMP (1995) encourages the application of "silvicultural practices for Riparian Reserves to control stocking, re-establish and manage stands, and acquire desired

vegetation characteristics needed to attain ACS objectives." The forest plan (FEMAT, 1993) reports that 87 percent of all surveyed wildlife species in western Oregon use riparian zones or wetlands, with "an array of species" adapted specifically to perennial, intermittent and ephemeral streams. There are several ways in which riparian vegetative characteristics have been shown to affect instream biota, including: (a) timing and quantity of large wood recruited, (b) the quality, quantity and timing of organic (litterfall) inputs, (c) rates of nutrient seepage and delivery to the stream through groundwater inflow, (d) groundwater chemistry, (e) solar radiation and stream temperature, and (f) the fungal, algal and bacterial (periphyton) community composition and associated rates of stream metabolism (Gregory, et. al., 1991; Naiman, et. al., 2001).

Conversely, the stream itself also influences the riparian forest. When streams become incised (as a result of elevated peak flows, removal of streamside vegetation, bank erosion and/or landsliding), the water table is lowered, and often the stream becomes disconnected from its floodplain. This process, over time, may change the character of the riparian vegetation so that it more closely resembles upland flora.

Riparian structural diversity, tree species composition, and understory shrub and herb diversity has not been systematically surveyed. Overstory stand size classes within the riparian zone on BLM administered lands were estimated from Forest Operations Inventory (FOI) birth year data, using 100-foot buffers for all streams within each of the eleven largest frontal tributaries to define riparian zones (Chart 6-4). Because more harvest has occurred on private lands, in general, than on public lands, estimates based on FOI data are likely to significantly over-represent the proportion of late seral riparian habitat available within each stream network.

Although this information is useful in assessing the overall condition of each stream catchment, the actual extent of the riparian habitat varies throughout the stream network, generally increasing downstream as the stream gradient decreases and the valley widens. SINMAP, an ArcView GIS extension that facilitates terrain stability modeling, was used by Pack et. al. (2001) to predict soil saturation based on topography (drainage area and slope). The methods used by Pack et. al. were employed within the Old Fairview WAU to map predicted patterns of soil saturation throughout the watershed. This mapping technique is useful in estimating the extent of flood prone areas and potential stream riparian habitat within the WAU. Potential riparian habitats are shown in Figure 6-3. These areas are also summarized by 7th field watershed in Chart 6-5(a), and by stream in Chart 6-5(c).

The total mid-seral forest land area (in acres) lying within BLM administered blocks is summarized by 7th field watershed in Chart 6-5(b) and by stream in Chart 6-5(d). These areas are also displayed graphically (in red) in Figure 6-3. These are the riparian areas that are most likely to benefit from silvicultural treatments designed to enhance wildlife and floral assemblages within the riparian zone. Areas lying within the federally designated Wild and Scenic River Corridor were excluded from this analysis.

Chart 6-4 Age Class Distributions of 100 foot Buffers BLM Administered Lands Only (2000)

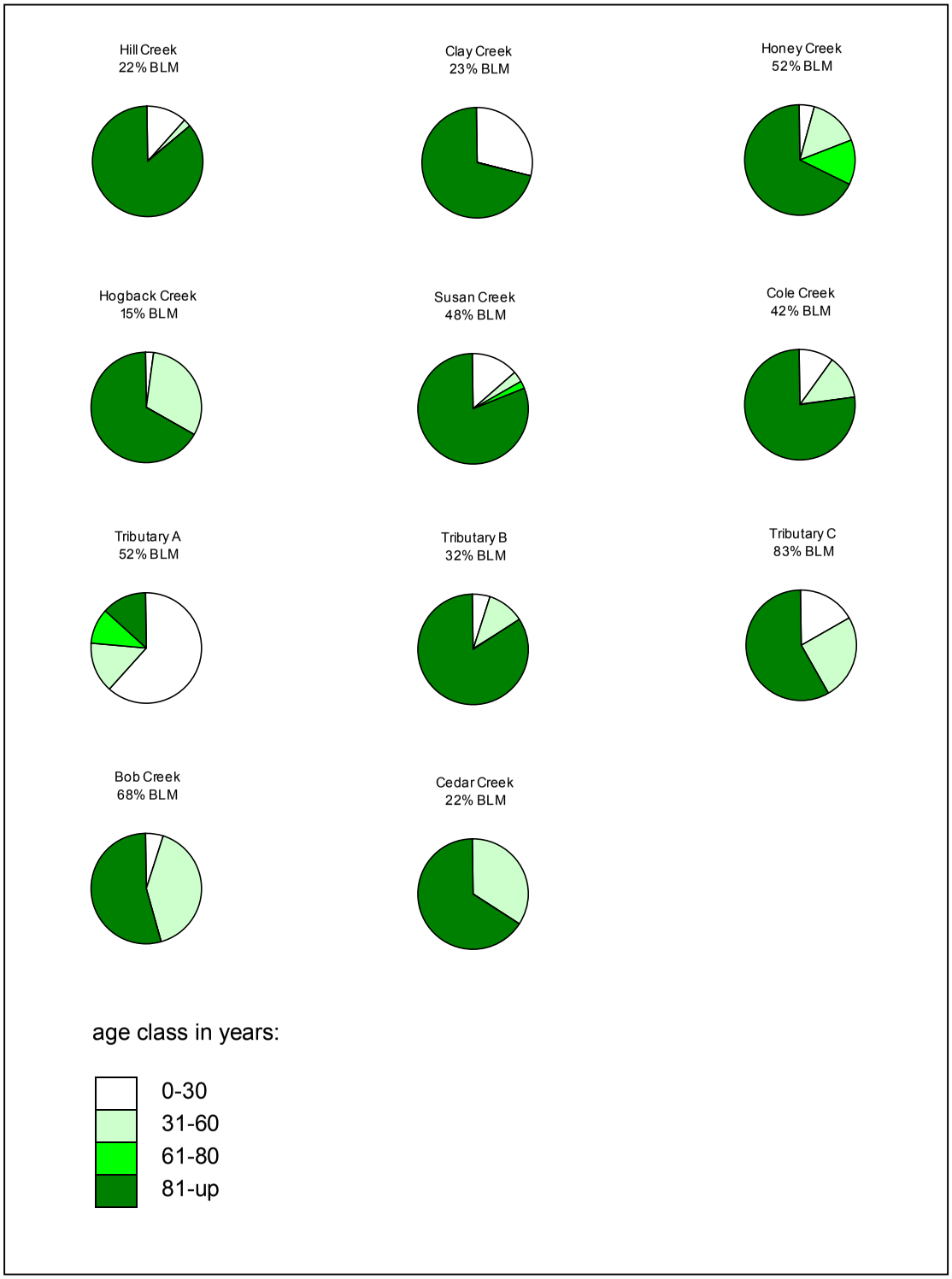
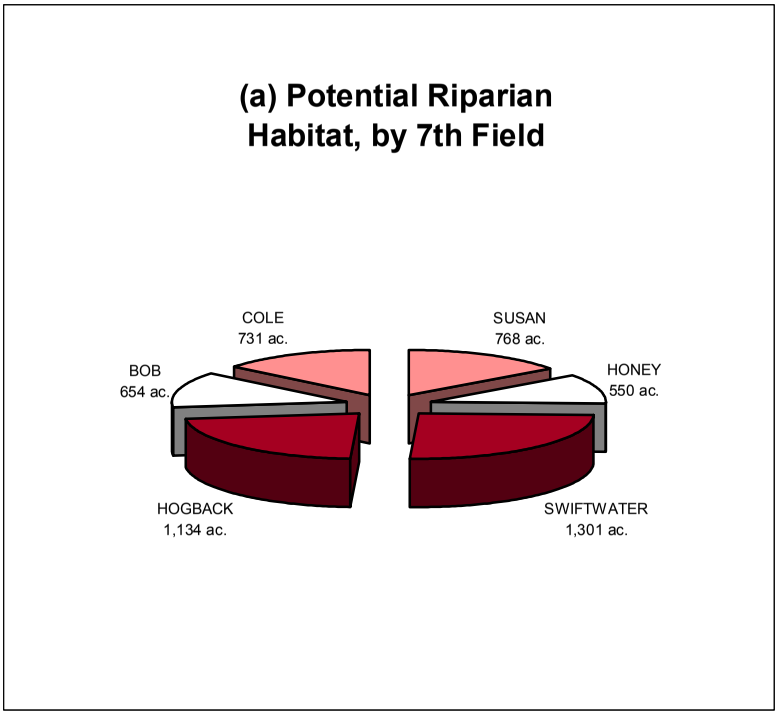
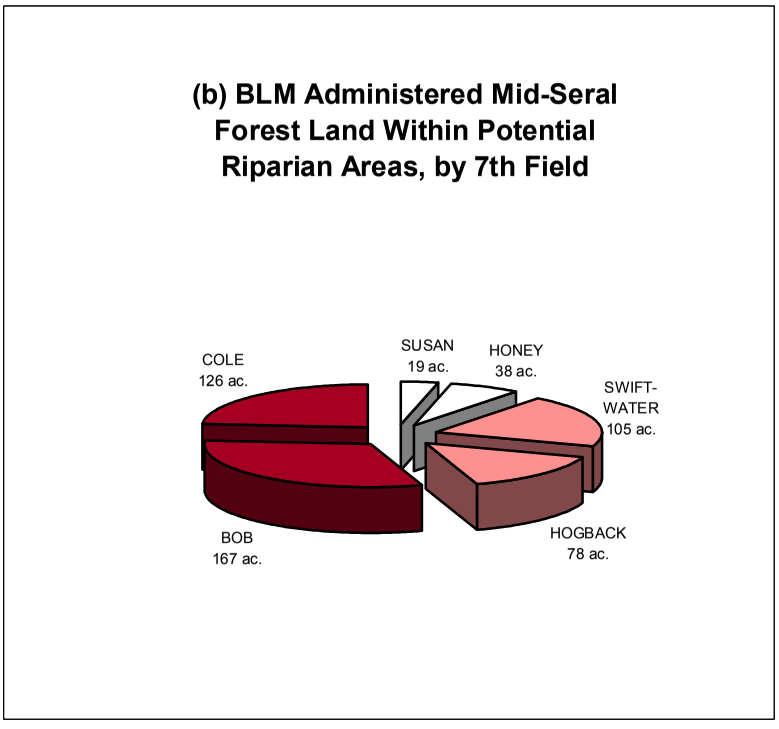
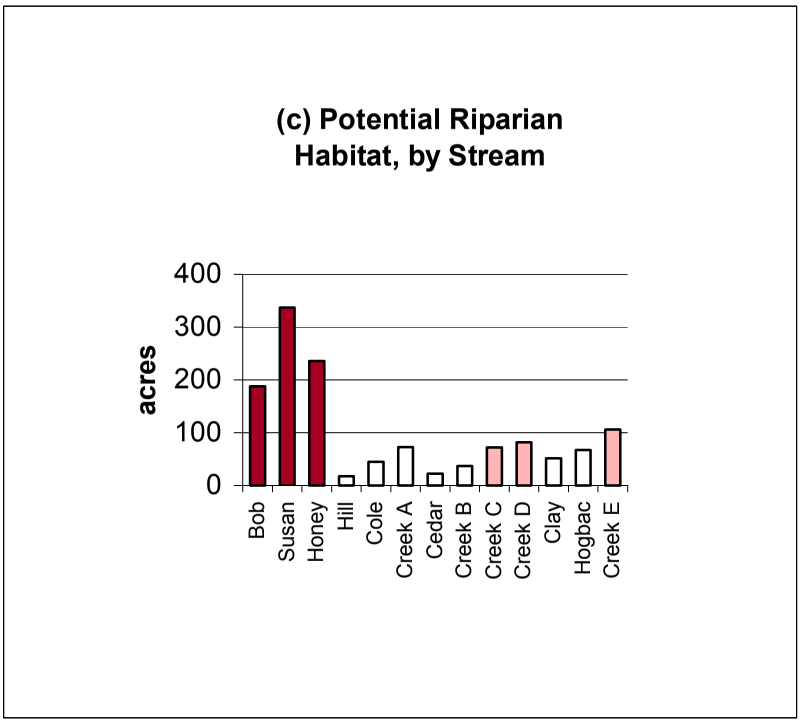
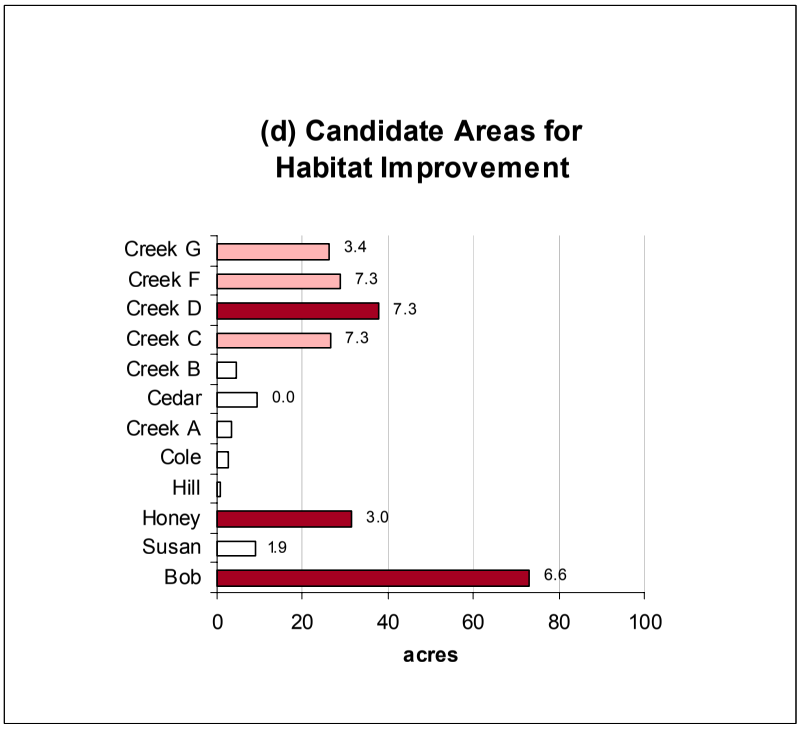


Chart 6-5 Potential Riparian Habitat









Note: the numbers next to the bars in Chart 6-5(d) indicate the road density within each stream's target riparian (soil saturated) zone.

3. Other Wet Habitat

Water tends to accumulate in areas where the topography converges or "benches," and where soils are poorly drained or compacted. Areas of topographic convergence were identified using contour maps and digital elevation models as described above. Computer generated maps are of limited use in identifying off-channel habitats, however, areas mapped in GIS were overlaid with aerial photo coverages to look for areas where changes in vegetation coincide with areas where water is likely to accumulate. A final site list of potentially rare and wet off-channel and upland habitats was compiled, and some of these sites were checked in the field.

Suspected wet areas (excluding flood prone areas adjoining major stream corridors) are shown in blue in Figure 6-4, and include wetlands, wet meadows, woodlots and lakes. These areas are described below.

a) Beaver Pond Complex

The beaver pond complex near Hill Creek (see photo, below) appears to be a unique habitat type within the Old Fairview. Formed by beaver activity along a small, 2nd order stream, the complex consists of a network of wet meadows composed of a mix of open ponds and areas dominated by various grasses, sedges, rushes and/or shrubs. An abandoned logging road bed encircles the lower part of the complex. No botanical or wildlife surveys have been conducted in this area.

b) Other Wet Areas

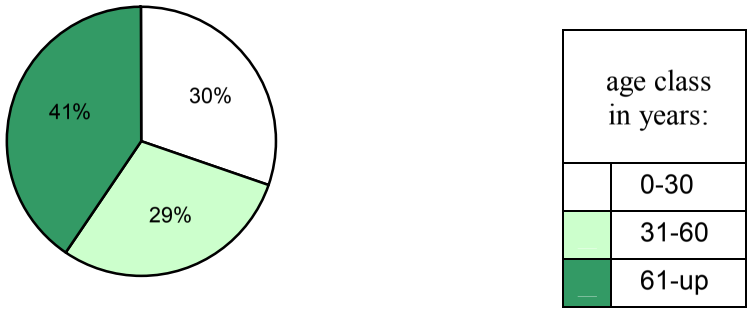
A number of wet or partially wet woodlots were observed to the west of Susan Creek and west of Hill Creek. These areas included sparse, mixed stands of pine, oak, ash, cedar, and/or madrone, and dense grassy understories dominated by sedges and rushes (Figure 6-4). A number of small wetlands were observed along the North Umpqua Trail, in the southern half of the WAU. Additional suspected wet and/or partially wet areas are located on privately owned lands.

C. Upland Tributary Hydrology

Although 7th field tributary stream flows have not been gaged, there is evidence that changes in flows have taken place throughout the Old Fairview WAU. Increased peak flows can cause changes in stream dimensions, patterns, and profiles as illustrated in Chart 6-3. Mechanisms that may alter flows include: loss of vegetative cover, compaction of soils due to the roads and skid trails, conversion of sub-surface flow to surface flow by road cut-banks, and the extension of the stream network by road ditch lines and culverts (Coffin and Harr, 1992; Jones and Grant, 1996; King and Tennyson, 1971; Megahan, 1971; Wemple, et. al., 1996).

Most, if not all, 3rd and 4th order streams in the watershed show evidence of recent bank scour, widening and degradation (downgrading). This trend is likely due in part to elevated peak flows resulting from rain on snow events within harvest units in the transient snow zone. Although there are currently significant errors associated with the use of digital satellite data to estimate stand characteristics, Western Oregon Digital Imagery Project (WODIP) size class distributions (based on 1993 satellite data) give some indication of the level of timber harvest that has occurred within the transient snow zone over the entire Old Fairview subwatershed (Chart 6-4). The transient snow zone is defined for the North Umpqua as the portion of the watershed that lies between 2000 to 5000 feet in elevation. Tree size classes are represented in WODIP by the estimated diameter at breast height (DBH) for each pixel. Size classes 0-10 inches, 11-20 inches and 21 inches and up roughly correspond to age classes 0-30 years, 31-60 years, and 61 years and up, respectively.

Chart 6-6 Age Classes within the Transient Snow Zone, 1993



Hydrologic Recovery Criteria used for the Umpqua National Forest (Jones et. al., 1990) suggest that stands are "fully hydrologically recovered" at approximately 30 to 39 years of age, depending on tree growth within each unit. It is important to note that age class distributions derived from WODIP coverages are of little use in analyzing the impacts of harvest on stream flows, except on a very large scale. This is because WODIP data is generally unreliable at the scale of individual 7th-field and smaller catchments.

Road systems can indirectly impact stream and riparian habitat networks by diverting subsurface flow, increasing runoff and peak flows during storm events, and increasing sediment delivery to streams. If roads are located within the floodplain, they can also directly displace riparian habitat. With the exception of a few isolated headwater (1st and 2nd order) streams (Figure 8-1), preliminary field observations have not provided any evidence that roads and skid trails are currently altering peak flows or sediment loads to streams within the WAU.

Road densities generally show the effects roads may have had over the past 50 years within an entire subwatershed and are displayed for Old Fairview in Table 6-6. However, new road management practices as well as road rehabilitation and restoration have changed the way much of the federal roads function within each watershed so that road densities may not be an accurate measure of road/watershed interaction and function.

Table 6-6 Old Fairview Road Densities

	Subwatershed		Road Length			Road Density		
	Area		BLM	Private	TOTAL	BLM	Private	TOTAL
Subwatershed	acres	Square Miles	miles	miles	miles	mile/mi2	mile/mi2	mile/mi2
Old Fairview	21921	34.3	88	84	172	2.6	2.5	5.0

Within Old Fairview, roads have displaced riparian habitat in several stream systems. As an indicator of the extent to which roads have displaced or impacted riparian and stream habitat, roads lying *within 100 feet of stream segments* were mapped and tallied. Riparian-zone road densities (in road miles per stream mile) were calculated for each major stream system. Road/stream crossing densities were also calculated for each major stream (within 100-foot buffers only), and results are shown in Table 6-7.

Table 6-7 Old Fairview Road and Stream Crossing Summary

Stream	stream xings	stream miles	xings/ stm mile	roads/ stm mile	rank*
Bob	21	11.38	1.8	1.3	4
Cedar	6	3.56	1.7	0.8	2
Clay Ck	7	3.10	2.3	1.7	6
Cole	7	3.32	2.1	1.7	6
Creek A	7	4.29	1.6	2.4	7
Creek B	13	5.98	2.2	1.7	6
Creek C	8	6.05	1.3	1.7	4
Creek E	4	2.40	1.7	0.6	1
Hill	19	5.56	3.4	2.1	10
Hogback	2	2.09	1.0	1.0	1
Honey	33	20.16	1.6	1.2	3
Susan	25	17.95	1.4	1.0	2
* rank increases as road and stream crossing densities increase					

Data indicates that road and stream crossing densities are lowest in Hogback Creek and Unnamed Creek E, and highest in Hill Creek. It is important to note that higher road and stream crossing densities do not necessarily imply a higher impact or risk to stream and riparian habitats. Factors such as road surfacing, design and maintenance, fill stability, culvert condition and underlying soil properties all influence the level of impact or risk that roads pose to instream habitats (see Figure 8-1).

Although future land management actions implemented under NFP best management practices are likely to have less of an impact on peak flows than historical practices, relationships between harvest activities and streamflow are generally complicated and difficult to characterize. For example, Harris (1977) found that clearcutting in the Alsea River Basin (western Oregon) increased measured peak flows by 20%, while Jones and Grant (1996) found that forest harvesting increased peak flows in the H. J. Andrews Experimental Forest by as much as 50% in small basins and by as much as 100% in larger basins. In one of the watersheds located within H. J. Andrews, Harr and others (1982) found no significant change in the magnitude or timing of peak streamflows following clearcutting. Risley (1994) concluded that the effect that clearcutting may have on peak streamflows appears to be related primarily to the harvest practices employed (e.g. yarding techniques, and road design and maintenance). Harr (1979) came to similar conclusions in a study of three types of harvest units (clearcut, 50% shelterwood retention, and 30% aggregated retention) in the Coyote Creek watershed of the Umpqua River Basin.

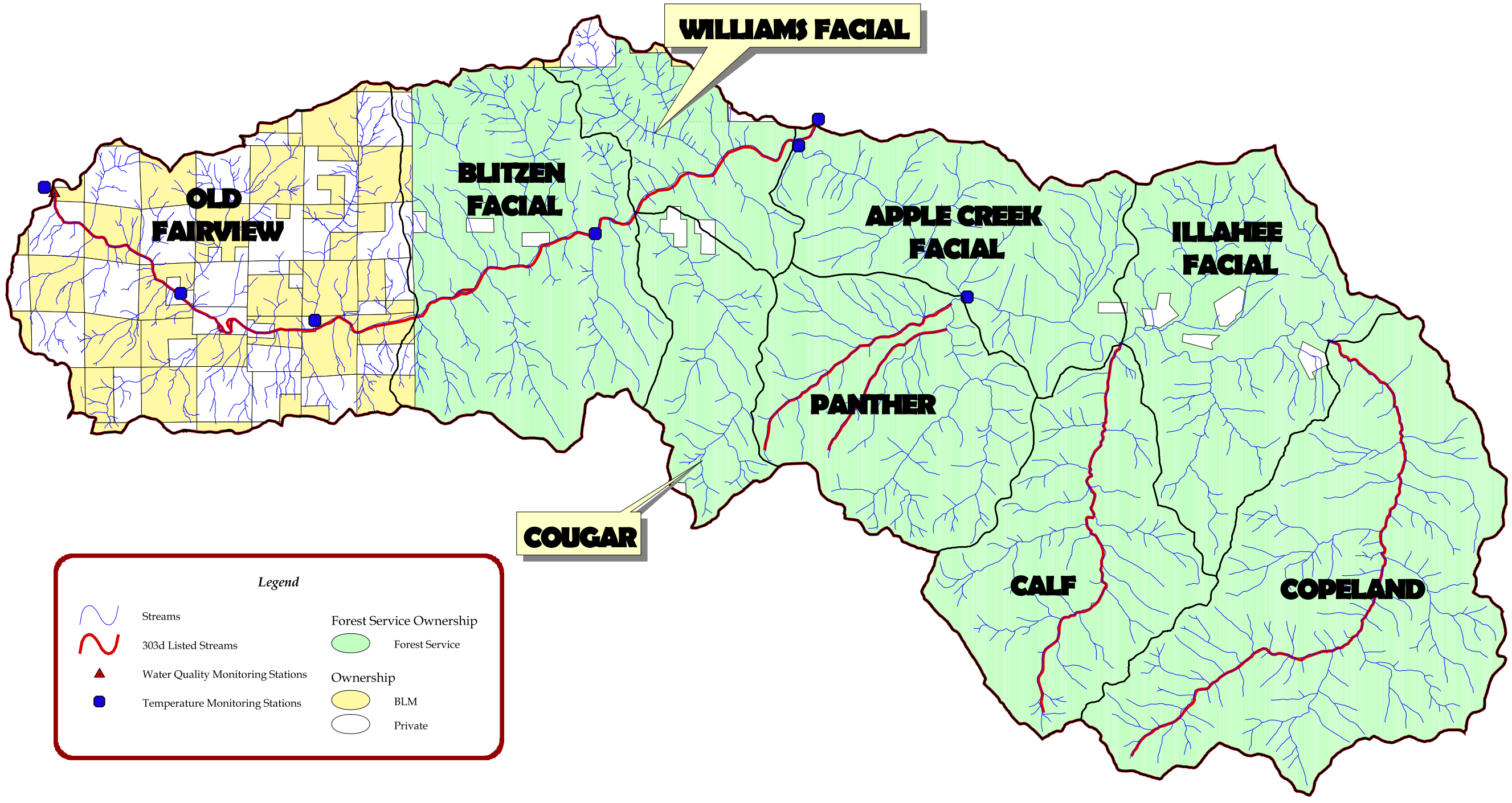
Thomas and Megahan (1998), in a re-analysis of the H. J. Andrews data, found that effects of timber harvest on peak flow are most significant for smaller flood events (recurrence interval of two years or less), and undetectable for larger events (greater than two year recurrence intervals).

This finding is worth noting because one to two-year events play a dominant role in shaping channel morphology and transporting sediment. However, more study is clearly needed before these relationships can be applied within the North Umpqua. NFP monitoring and adaptive management programs should, on a regional scale, provide the information necessary to answer these questions.

Figure 6-1

Middle North Umpqua 5th Field Watershed

303d Listed Streams and Monitoring Sites



Legend

- Streams
- 303d Listed Streams
- Water Quality Monitoring Stations
- Temperature Monitoring Stations

Forest Service Ownership
- Forest Service

Ownership
- BLM
- Private

N

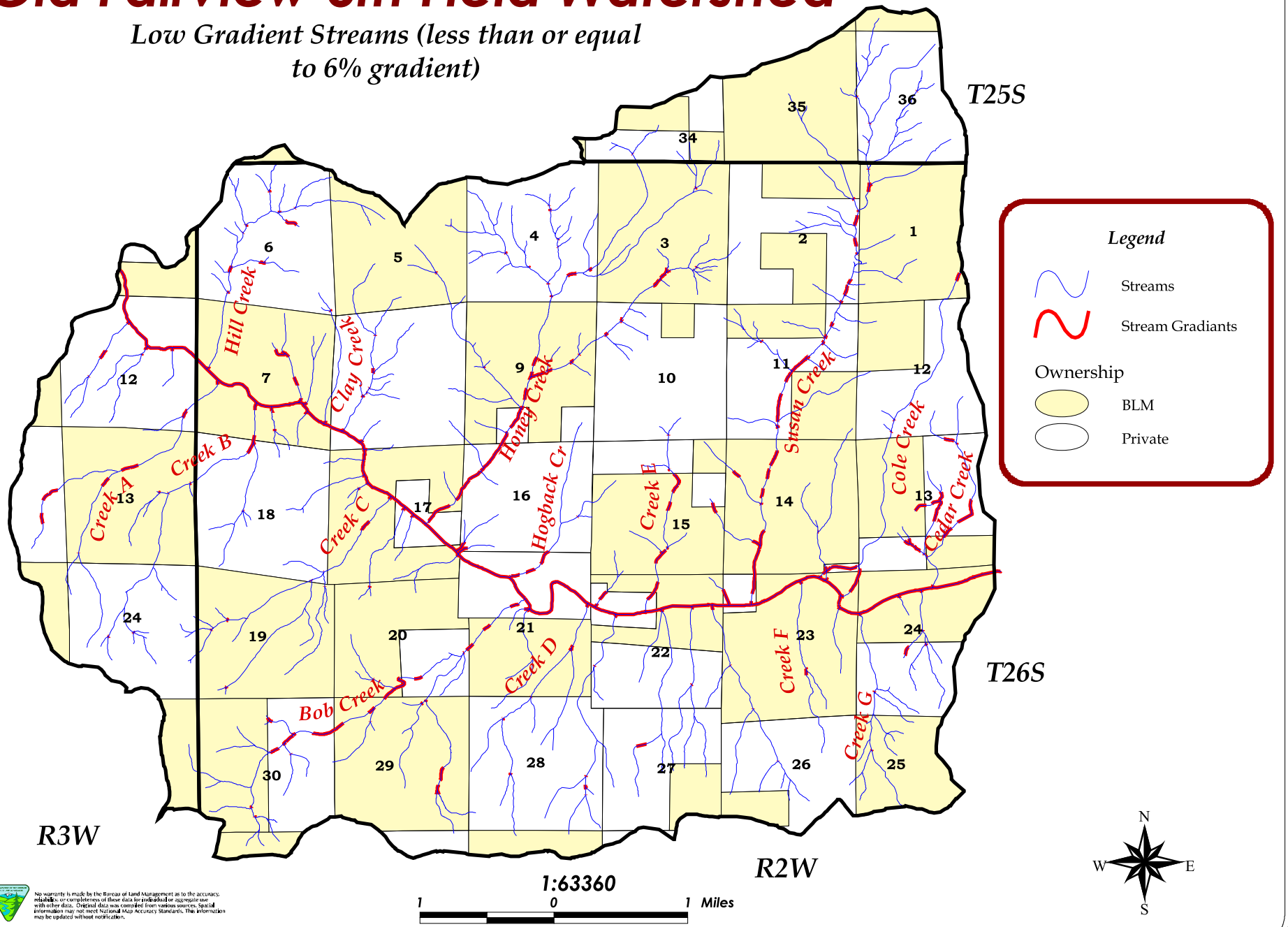
1:125000

2 0 2 4 Miles

Old Fairview 6th Field Watershed

Figure 6-2

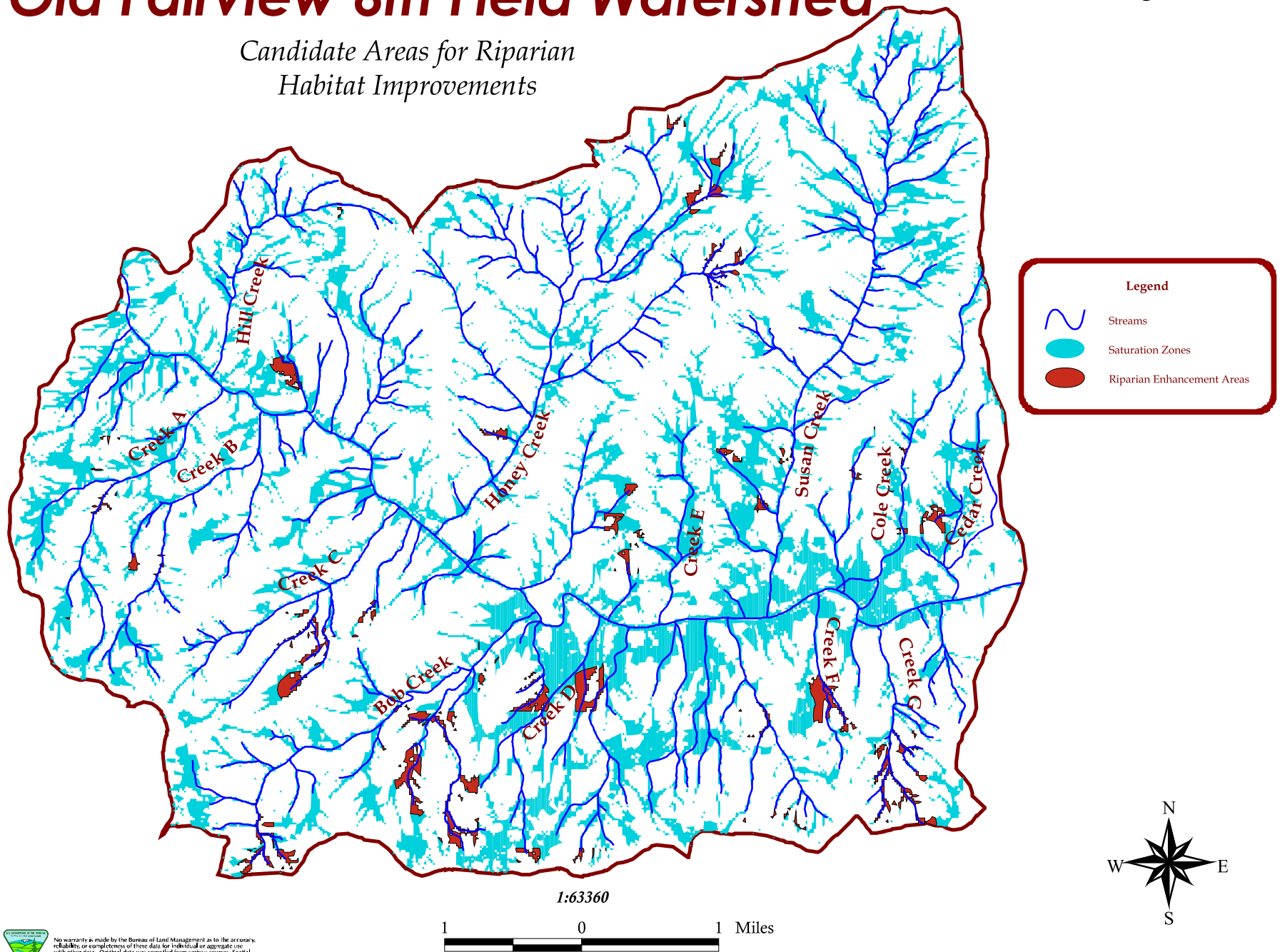
Low Gradient Streams (less than or equal to 6% gradient)



Old Fairview 6th Field Watershed

Figure 6-3

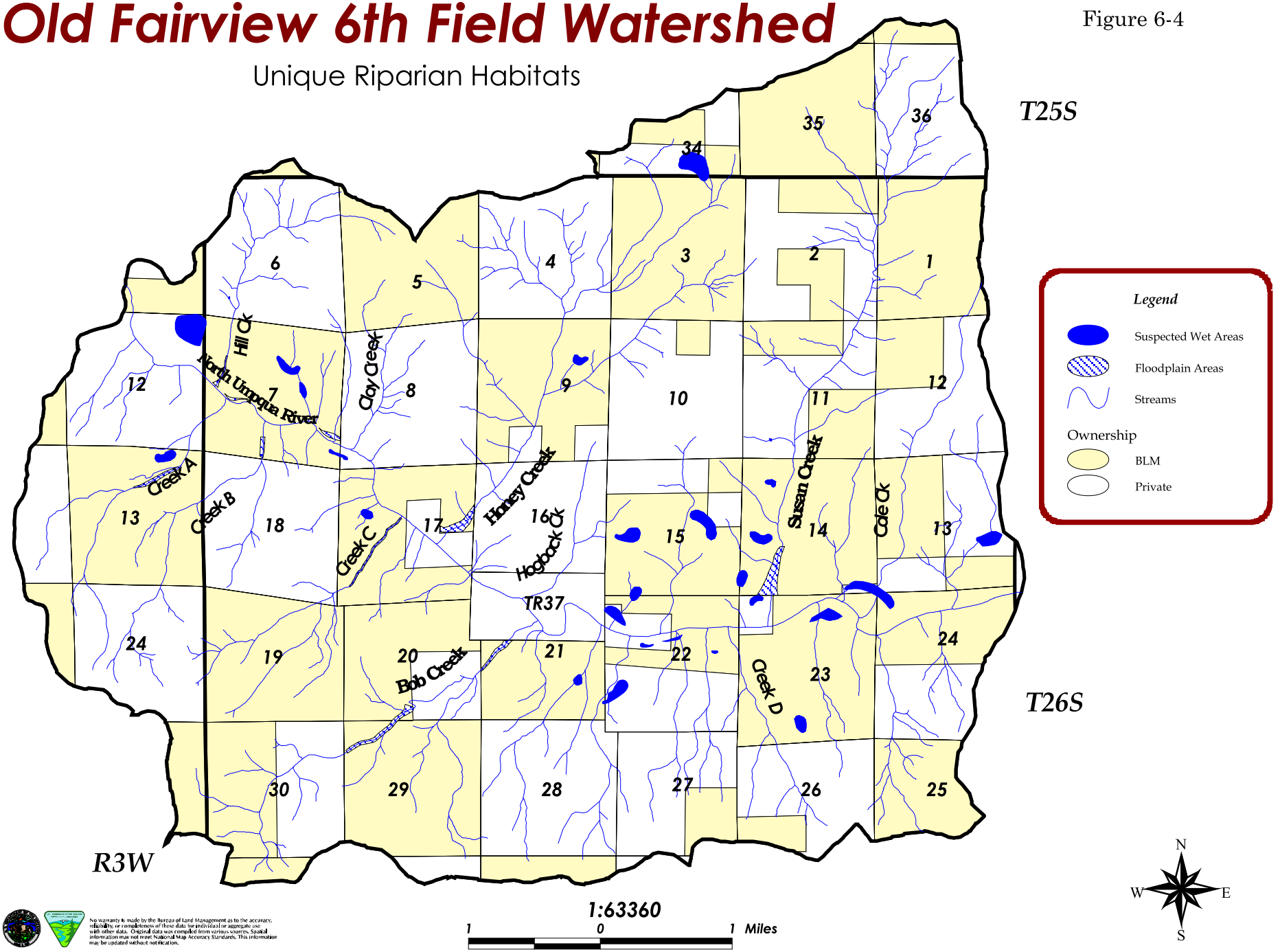
Candidate Areas for Riparian Habitat Improvements



Old Fairview 6th Field Watershed

Figure 6-4

Unique Riparian Habitats



7 AQUATIC HABITAT AND ASSOCIATED SPECIES

A. Aquatic Species, Presence and Distribution

1. Fish

Fish species present within the Middle North Umpqua watershed are shown in **Table 7-1.** This information is based on fish caught in a rotary screw trap operated near the mouth of Rock Creek by BLM personnel and by known occurrences within the North Umpqua River. **Figure 7-1** shows fish distribution for the Old Fairview subwatershed. This map is based on the most current knowledge as compiled by the Oregon Department of Fish and Wildlife, and on visual presence/absence surveys conducted by BLM Fisheries Biologists. The BLM acknowledges that fish distribution may be underestimated in this figure. Hill Creek has not been surveyed, but it has the most potential for having fish species present among the un-surveyed streams.

Table 7-1 Fish Species Present In Middle North Umpqua Watershed

Native species		**Introduced species**	
Common name	*Scientific name*	*Common name*	*Scientific name*
steelhead	*Oncorhynchus mykiss*	*tui chub*	*Gila bicolor*
coho salmon	*O. kisutch*	*brook trout*	*Salvelinus fontinalis*
chinook salmon	*O. tshawytscha*	*brown trout*	*Salmo trutta*
cutthroat trout	*O. clarkii*		
Pacific lamprey	*Lampetra tridentata*		
Umpqua dace	*Rhinicthys cataractae*		
Sculpin*	*Cottus sp.*		
redside shiner	*Richardsonius balteatus*		
speckled dace	*Rhinicthys osculus*		
Umpqua pikeminnow	*Ptychocheilus umpquae*		
largescale sucker	*Catostomus macrocheilus*		
Western brook lamprey+	*Lampetra richardsoni*		

* There are numerous members of the sculpin family suspected to be found within this watershed

\+ The habitat in this watershed is capable of supporting this lamprey species. There have not been any confirmed sightings, but it is very probable that they occur within the Middle North Umpqua watershed.

Old Fairview subwatershed has two unique fisheries habitat types which support different species and life stages of fish. The small tributaries (Susan, Bob, and Honey Creeks) contain spawning and rearing habitat for lower water velocity dependant fish species. These include coho salmon, steelhead trout, cutthroat trout, pacific lamprey, and resident non-game fish species (dace and sculpin). While these tributaries comprise a small part of the watershed, they are significant in the overall high production rates for these species. Winter 2000-01 spawning surveys indicate high Coho redd densities in the half mile of anadromous habitat on both Susan and Bob Creeks. These numbers can be indicative of steelhead production levels as well.

The mainstem of the North Umpqua River is important for chinook salmon spawning and rearing. Other species found here include the pike minnow and sucker species. During the warmer summer months, this habitat also provides an important refugia for the tributary-spawned species. The North Umpqua retains cooler water temperatures during this crucial rearing time. During years of low flows, fish can move down from the tributaries into the mainstem. When the rains bring levels back up, these fish can return to the habitat found in these smaller tributaries.

2. Listed Fish Species

The Oregon Coast coho salmon (Oncorhynchus kisutch) has been listed by the National Marine Fisheries Service (NMFS) as a threatened species under the Endangered Species Act (Federal Register August 10, 1998 vol. 63, number 153). The Oregon Coast steelhead trout (Oncorhynchus mykiss) is designated as a candidate species by NMFS (Federal Register March 19, 1998 vol. 63, number 53). The Pacific lamprey (Lampetra tridentata) is on the United States Fish and Wildlife Service (USFWS) list as a Species of Concern and is considered a Bureau Sensitive species by the BLM (Manual 6840).

The Magnson-Stevens Fishery Conservation and Management Act (MSA) requires Federal action agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH) identified under the MSA. The Magnuson-Stevens Act defines adverse effects as any impact which reduces the quality and/or quantity of essential fish habitat. Adverse effects include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative or synergistic consequences of actions.

The Umpqua River (UR) cutthroat trout (*Oncorhynchus clarki clarki)* was listed as endangered under the ESA by the NMFS on August 9, 1996 (61 FR 41514) and Critical Habitat for this species was designated on January 9, 1998 (63 FR 1388). The Oregon Coast (OC) coho salmon (*O. Kisutch)* and Oregon Coast (OC) steelhead trout (*O.Mykiss)* Evolutionary Significant Units (ESUs) were proposed as threatened under ESA by NMFS on July 25, 1995 (60 FR 38011) and August 9, 1996 (61 FR 41541), respectively. The OC coho and OC steelhead ESUs were reclassified as candidates for listing under the ESA by NMFS on May 6, 1997 (62 FR 24588 and March 19, 1998 (63 FR 13347) respectively, but the OC coho were substantially listed as threatened on August 10, 1998 (63 FR 42587). Critical Habitat was proposed for OC coho in May of 1999 (64 FR 24998) and designated March 17, 2000 (65 FR 7764). As of April 19, 2000, UR cutthroat trout were delisted (65 FR 20915) due to the placement of the Umpqua River population in a larger ESU (Oregon Coast).

3. Mollusks

Currently, there are approximately 350 species of mollusks known to occur in forests within the range of the northern spotted owl (FEMAT 1993). Over 100 species have been identified to be associated with late seral forests. These include aquatic and land snails and slugs. The range of many of these species is unknown.

Other aquatic dependent species in the Watershed include macro-invertebrates and amphibians. Aquatic macro-invertebrates have been widely used as an indicator group for many years in pollution studies involving flowing waters (DeShon, 1995), and are currently a central component of water resource management programs throughout the world (Doberstein, et. al., 2000). Aquatic macro-invertebrates are sensitive to a wide variety of stressors -- whether biological, chemical or physical in origin -- making macro-invertebrate community indices ideal integrative indices for evaluating the cumulative impacts of management activities. Macro-invertebrate communities are far more diverse than fish communities in the Northwest (by two to three orders of magnitude, overall), which, according to the Oregon State Water Quality Monitoring Guide Book, makes the evaluation of macro-invertebrates a more meaningful indicator of biological integrity. In addition, the relative sensitivity or tolerance of macro-invertebrates to a wide range of water quality and other physical stream conditions are well known (WQMT, 1997). Finally, DEQ listing criteria describe macro-invertebrate indices as a primary means of documenting that sedimentation and habitat modification pose significant limitations to fish or other aquatic life (OAR 340-41). *For more on amphibians, refer to the wildlife section.*

B. Human Barriers to Aquatic Passage

The process of building roads includes the addition of culverts to allow for water to be unimpeded by the road crossing. Many of these culverts do not allow for the same passage of aquatic organisms. Culverts may not have included aquatic passage requirements in the design process, or over time, the culvert created an outlet drop impassible by aquatic species. Roads crossing streams can also be barriers that stop landslide material from being distributed downstream. This prevents the low crossing stream from recruiting gravels, cobbles, and coarse woody debris from high gradient streams and headwall areas (Jones, et. al., 2000).

Within the BLM road system, there has been only one culvert identified that is restricting access to fisheries habitat within this watershed. This culvert is located in Honey Creek on private lands in Township 26, Range 2, Section 4 SE. Habitat available above this culvert is roughly 1/4 mile. The Oregon Department of Transportation is currently prioritizing culverts along the North Umpqua Highway 138 and will take the lead in restoring aquatic passage along this road.

There are numerous natural barriers that severely limit fisheries habitat access within the subwatershed as shown in Figure 7-1.

C. Current Condition of Aquatic Habitat

1. Bradbury Process Ranking of 6th Field Subwatersheds

The technical advisory committee for the Umpqua Basin Watershed Council prioritized 5th field watersheds throughout the Umpqua Basin using the Bradbury Process. This is a relative prioritizing system helping to determine which watersheds are in better condition, and more important for restoration efforts. Middle North Umpqua came out as a high priority. Within the Middle North Umpqua 5th Field Watershed, the 6th field subwatersheds were also prioritized using the same process. The following Table 7-2 gives a breakdown by subwatershed showing that Old Fairview was a medium priority.

Table 7-2 Bradbury Ranked Subwatersheds within Middle North Umpqua

6th Field Subwatershed	Category	Bradbury Rating Score
Williams Facial	High	20
Apple Facial	High	19
Illahee Facial	Moderate	17
Blitzen Facial	Moderate	17
Old Fairview Facial	Moderate	17
Copeland	Low	14
Calf	Low	14
Panther	Low	13
Cougar	Low	13

2. Old Fairview Aquatic Habitat

Within Old Fairview, Figure 7-2 gives a general picture of the conifer vegetation age classes within the federal Riparian Reserve system. Aquatic habitat surveys assess current condition of the habitat available for aquatic organisms in the stream and in the surrounding riparian areas. These surveys are used to identify habitat protection and restoration opportunities. By using individual reach data, restoration may be developed based on the presence, absence, or quality of certain habitat components such as shade, large wood, and pools. ODFW has only conducted full surveys on two tributaries and a partial survey on a third tributary to the North Umpqua River in this subwatershed (Figure 7-3). Further, in some of the surveys, not all of the data was collected for each reach. This leaves some wide data gaps. Listed below are the general findings from these surveys and the BLM observations on Bob Creek (1/17/01).

For more detailed analysis of the sediment regime and landslide occurrence, please refer to the Geology and Soils section.

Susan Creek- Rated 'Fair' for all reaches: Total pool area and average residual pool depth are low except for reach 2. Fines in pools range from 11-21%. Dominant substrate is either boulders or bedrock. LWD is low in all reaches. Percent shade is good in reaches 1, 3, and 4 while reaches 2 and 5 are borderline fair. There is a large waterfall roughly a mile from the mouth that restricts anadromous distribution. Another waterfall at the beginning of reach 5 limits resident populations.

Honey Creek- Rated 'Fair' for all reaches: Total pool area and average residual pool depth are low in all reaches. Fines in riffles of reach 1 are high at 43%. Reaches 2 and 3 have no riffles so % fines cannot be calculated. However, % fines in other habitat units are also high in these reaches. Boulder is the dominant substrate for this creek. Shade ranges from 90-93%. LWD pieces are higher than Susan Creek, but are still low for the habitat rating. Gradient and an impassible culvert are the limiting factors to fish distribution.

Honey Creek Trib A- Rated 'Poor' to 'Fair': Sediment is extremely high in this tributary. This is probably the result from the active natural slide occurring in this system. Streambanks are also actively eroding in both reaches (only 50% vegetation stabilized), adding to the sediment problem. However, this tributary also has the largest amount of LWD within this watershed. There are no fish present in this tributary.

Bob Creek- Although a formal habitat survey has not been performed on this creek, the following data was collected by BLM personnel. Turbidity was evident in the stream course in low flow. The mouth of the creek resembles an alluvial fan and is comprised of large amounts of gravel suitable for salmon spawning. This fan provides important off-channel habitat for the North Umpqua. Bob Creek itself had fair amounts of gravel and a few key pieces of LWD. This is only evident in the first 1/4 mile up from the mouth as the stream increases in gradient relatively quickly. This unique habitat at the mouth could be the result of a recent debris torrent that could have deposited most of these materials.

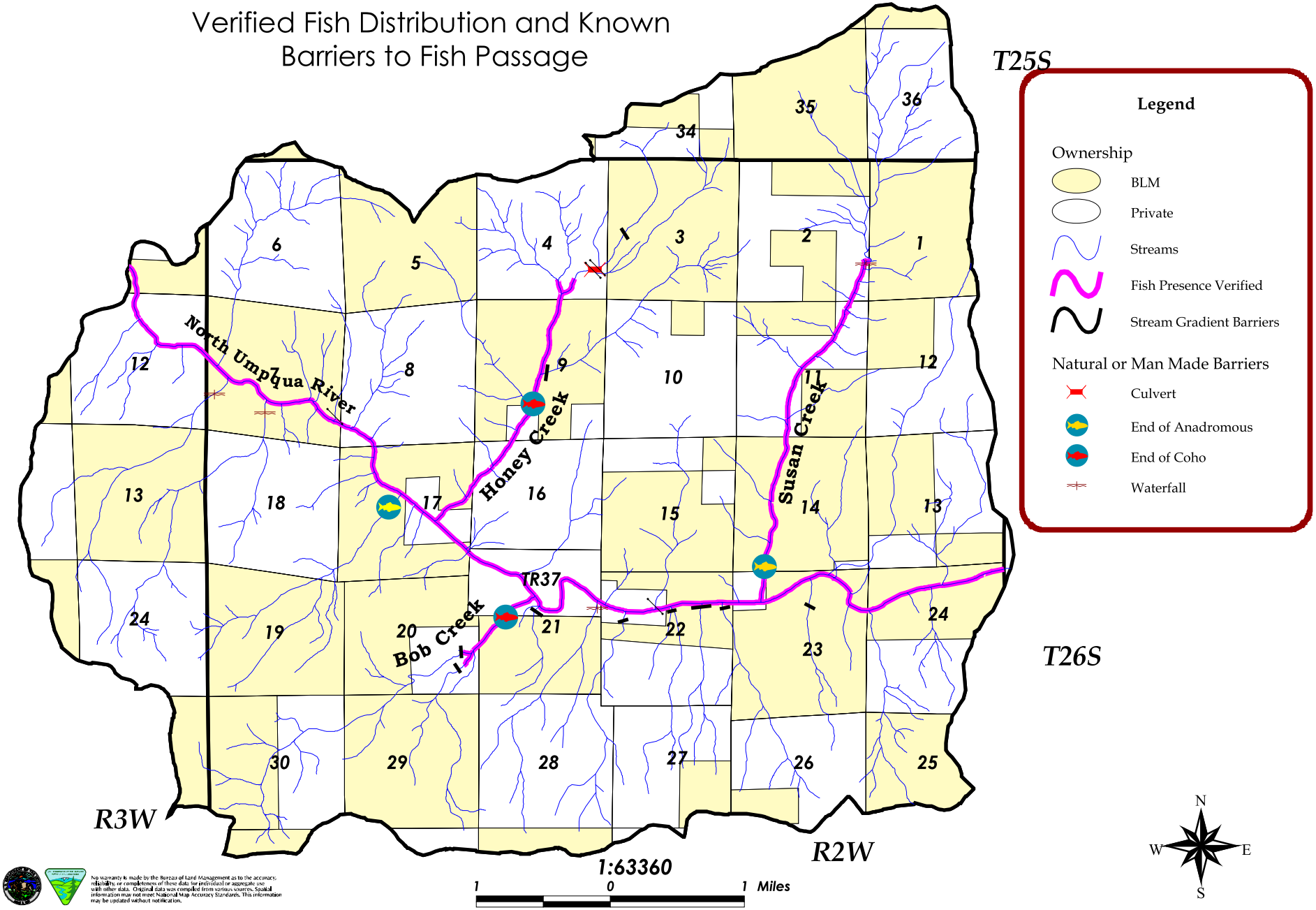
These tributaries show that the watershed is lacking large woody debris. This is the result of past logging practices and the fisheries "stream cleaning" ideology of the 1960's and 1970's. Many of the Riparian Reserves were harvested before receiving the Reserve designation instituted by the Aquatic Conservation Strategy (1994). Figure 7-2 and Table 3-9 show that of the total Riparian Reserve acreage, approximately 29% of the forest vegetation is younger than 80 years. Stand density management (thinning) can accelerate the attainment of the large tree diameters exhibited in these older stands (Tappeiner et al).

Large woody debris is a key component of aquatic habitat. Large wood serves many functions as instream structures; pool formation, spawning gravel retention, and protective cover from terrestrial predators (Bisson et al). Large conifers are preferable to hardwoods. Anderson and others have shown that conifers are more resistant to rot (1978). This allows for a longer time frame for the tree to be effective in interacting with the stream channel. Thinning in Riparian Reserves will accelerate the future recruitment of large diameter conifers.

Old Fairview 6th Field Watershed

Figure 7-1

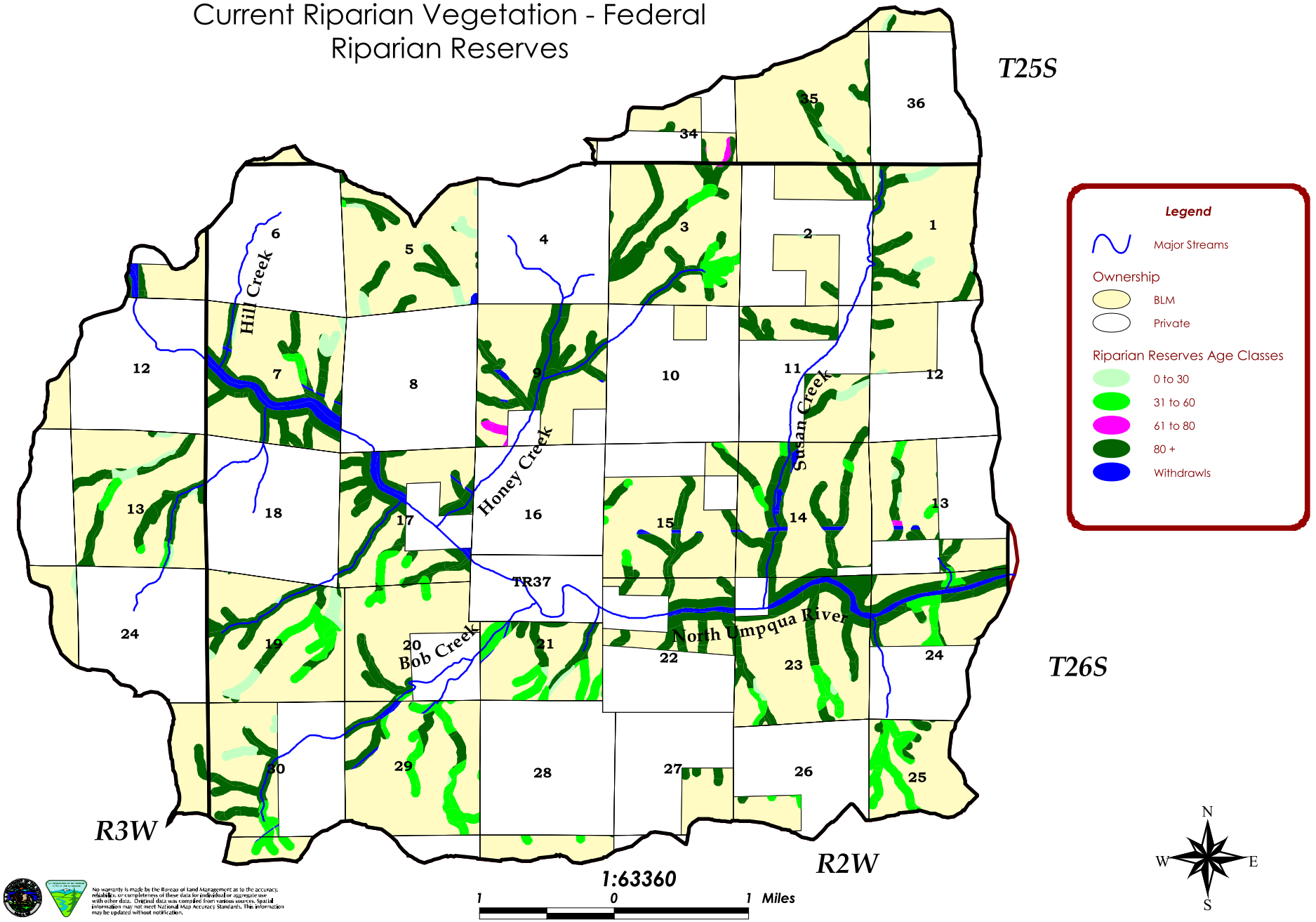
Verified Fish Distribution and Known
Barriers to Fish Passage



Old Fairview 6th Field Watershed

Figure 7-2

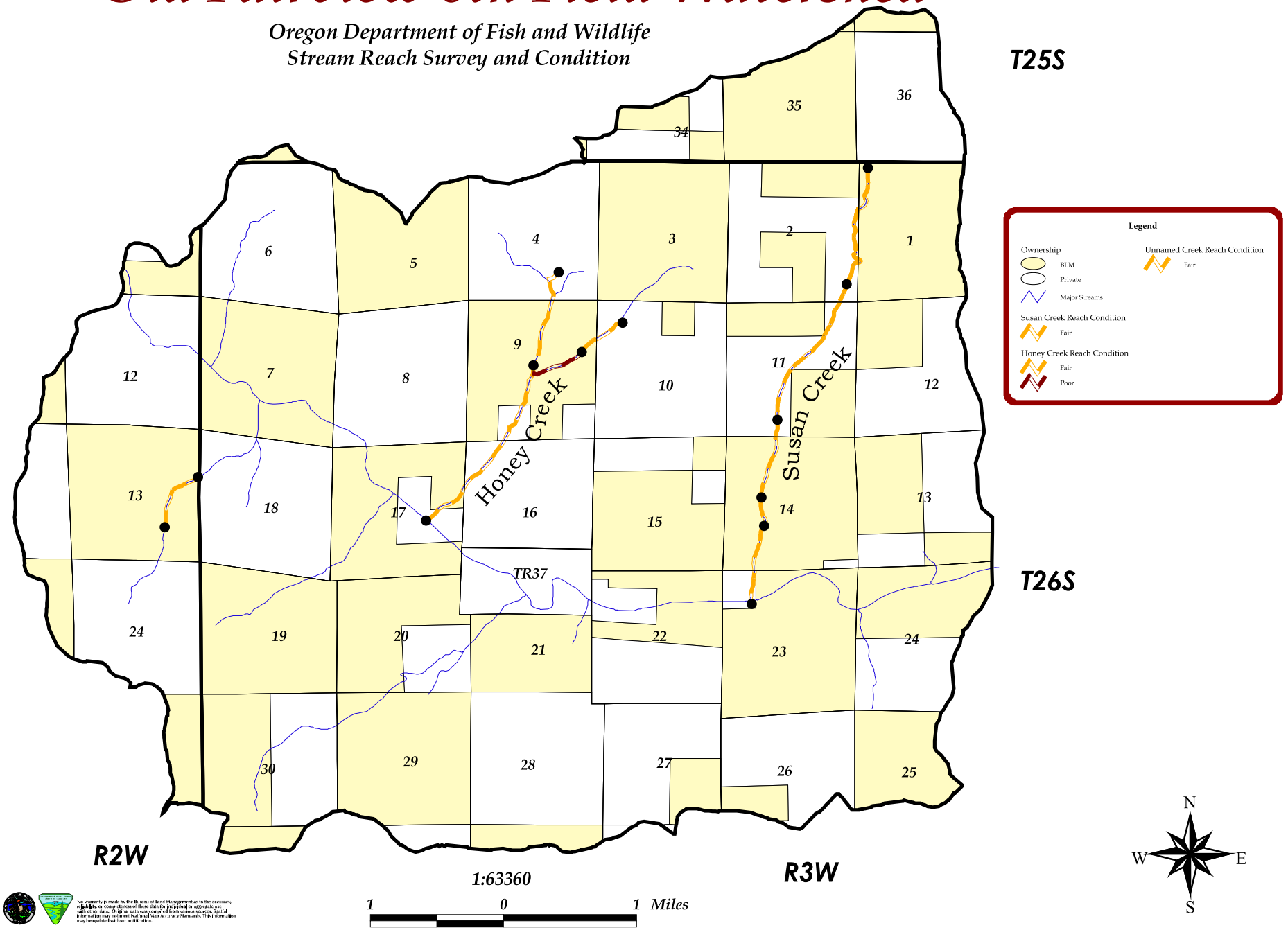
Current Riparian Vegetation - Federal Riparian Reserves



Old Fairview 6th Field Watershed

Figure 7-3

Oregon Department of Fish and Wildlife
Stream Reach Survey and Condition



8 MANAGEMENT OPPORTUNITIES

The Roseburg District RMP has given land use allocations with fairly prescriptive management direction. The following management opportunities are meant to stay true to the intent of those land use allocations while also providing further direction that would enhance the objectives of those allocations as well as maintaining and restoring the overall ecosystem within the Middle North Umpqua watershed.

A. Partnerships

Actively seek opportunities to develop partnerships with USFS, ODFW, Pacificorp, key private landowners, and other interested parties for the restoration identified below. The mixed ownership illustrated on Figure 1-3 shows opportunities to collaborate with USFS as well as the private landowners within the watershed. Through the Settlement Agreement for the North Umpqua hydroelectric, off-site mitigation funds have been identified for use in surrounding watersheds including the Middle North Umpqua. Opportunities exist to collaborate and leverage funding for restoration within this watershed. As identified on page 23 above, there are many groups who have a great interest in this portion of the North Umpqua and could become partners for developing grants as well as volunteer for restoration work.

B. Commercial Thinning

Within GFMA and Connectivity land use allocation, commercially thin highest priority stands (stands pre-commercially thinned, fertilized, and older than 40 years) where topography and existing roads facilitate logging. A majority of these types of stands occur in the south side of the Old Fairview subwatershed. Although the opportunity exists within the Old Fairview subwatershed, a district wide analysis (RELM) has suggested that regeneration harvest be deferred temporarily. However, within the General Forest Management Area (GFMA) and Connectivity land use allocations opportunities exist to convert early and mid-seral forest towards the late seral stage through active management and growth (Figures 1-7, 3-2).

There are just over 1,500 acres within the watershed that have been regenerated following timber harvest. Of this, about 1,274 acres have been pre-commercially thinned and 744 acres have been fertilized. These are the high priority stands for treatments designed to manage density to meet the RMP objectives.

Thinning mid-seral stands also provides management opportunities to develop and/or enhance future habitat for NSOs and RTVs. This is based on thinning mid-seral stands to a level that will allow species diversity to increase in the understory by allowing sunlight to reach the forest floor, allow conifers to increase canopy density, increase in diameter and develop structural attributes of older-growth forests in a shorter time period than if stands were left unthinned, and allow hardwoods to develop in the overstory. Thinning increases the potential for these stands to

become suitable for many species of wildlife that are dependent on older-forest types in a significantly shorter period of time than is possible without management.

C. Riparian And Withdrawn Area Forest Enhancement

Evaluate and then thin mid-seral forest stands within reserve and withdrawn areas to meet long-term wildlife and fisheries objectives. When thinning in reserves, do not leave cut trees for LWD but evaluate the amount of existing LWD two years after thinning. If LWD is lacking, develop LWD from existing stand as needed. There are approximately 819 acres of BLM administered riparian and other reserves (Table 3-9) within Old Fairview that were clearcut harvested from 1940 to 1995. Approximately 300 of these acres would be classified as high priority riparian habitat because of the nature of the stream gradient and geology. The largest available patches are located in Bob Creek and the East Fork of Bob Creek and Unnamed Creeks C and F; and just south of the beaver pond complex near Hill Creek (Figure 7-2). Hayes, et. al., 1997 show that stands thinned to 50 to 100 TPA will more closely parallel development taken by natural late seral stands than stands managed for maximum timber production. Objectives should be set to provide enough canopy openness and light for vigorous tree regeneration and understory development, accelerated individual tree growth, and development of diverse habitats (Chan, *et. al.,* 1996). Silvicultural treatments need to encourage a mix of species and ages of both conifer and hardwood trees. Steps should be taken to ensure that a natural mix of native species are regenerated, including shrubs and forbs. Reference sites can provide guidance in determining appropriate targets for tree spacing and species composition. Interplant where needed with native species, including hardwoods in areas where they have been displaced.

Thinning these mid-seral stands with the above objectives allows for the development and enhancement of future habitat for NSOs and RTVs. As stated above, increased light to the understory allows conifers to increase canopy density, increase in diameter and develop structural attributes of older-growth forests in a shorter time period than if stands were left unthinned. Thinning increases the potential for stands to become suitable for many species of wildlife that are dependent on older-forest types over a significantly shorter period of time than is possible without management. As a result of thinning to meet wildlife objectives, long-term fisheries objectives would also be met by creating larger diameter trees sooner. In future years as they fall into streams, these larger diameter trees are more desirable for instream structures because they are more durable than the smaller diameter suppressed non-thinned trees.

D. Fire Management

Immediately suppress all uncontrolled fires and treat hazard fuels with prescribed fire that may result from BLM management activities or to protect urban interface areas. Due to the large percentage of private lands intermingled with BLM lands, all uncontrolled fires should be suppressed immediately. Douglas Fire Protection Association provides fire protection for BLM and industrial forest lands. Recommend DFPA continues rapid initial attack on all fires to protect existing resource values and reduce potential liability to the BLM from fire spreading to

private lands. Transportation management objectives for access roads should balance the need for fire protection and human use against the impact roads may have on water, fish, and wildlife resources. Emphasize fire/fuels management cooperation across agency and ownership boundaries.

Fuel treatments including the use of prescribed fire should be considered for hazard reduction, site preparation, and restoration of desired vegetation conditions. All activity fuels (slash) created by logging, thinning, etc. will be assessed to determine if fuel treatments are necessary for reforestation and/or wildfire hazard reduction purposes.

Identify areas with high fire risk and those lands where the consequence of fire would be severe. The urban interface areas and recreational site should initially have the highest level of review for potential fuel treatment. Projects already identified include brush, slash and debris piling on BLM lands adjacent to the Susan Creek Mobile Home Park.

E. Noxious Weed Control

Using an integrated pest management approach in accordance with guiding documents,[14] the following are recommendations specific to Old Fairview:

1. Keep Relatively Uninfested Areas Uninfested

As a priority, survey and maintain Susan Creek Campground and the Susan Creek Falls Trail so that they remain free of new noxious weed sites. These popular recreation areas are relatively noxious weed-free areas within Old Fairview. Any new noxious weed infestations found in these recreation sites should be vigorously controlled.

2. Contain and/or Reduce Noxious Weed Infestations

Priority 1 - Prevent New Invaders

Implementation of the best known practices detailed in the footnoted documents will help prevent new noxious weeds from becoming established in Old Fairview.

Priority 2 - Eradicate New Invaders

Eradicate new invaders before they become established. As discussed in the noxious weed section above, several weed species currently not found have the potential to occur within Old Fairview. Adjacent lands need to be surveyed to ensure all new infestations have been located. New invaders should be isolated and eradicated as soon as they are officially identified. This should be given the highest priority in noxious weed control funding and all available

[14] BLM's Northwest Area Noxious Weed Control Program Environmental Impact Statement Record of Decision (ROD) (USDI BLM 1986), the Supplement (USDI BLM 1987), Roseburg District Resource Management Plan (RMP) (USDI BLM 1995a), Roseburg District Integrated Weed Control Plan Environmental Assessment ROD (USDI BLM 1995b), and Partners Against Weeds (USDI BLM 1996)

integrated weed management techniques should be used to eradicate new invaders. The causes of noxious weed infestations should be identified and treated to reduce the possibility of reestablishment. These recommendations are for all "A" list weeds and "B" list weeds new to the Roseburg District or in small enough infestations where eradication is possible.

Priority 3 - Control of Established Infestations

Prevent further spread of established noxious weed species using all available types of control measures although biological control measures should be emphasized on extensive infestations. Specific to Old Fairview "B" list noxious weeds priorities would include:

- **Transmission line corridor** infestation of scotch broom and other noxious weeds. This area is expected to be addressed in the North Umpqua hydroelectric relicensing.

- **English ivy** infestation at Stick Beach and Douglas County Lands (T.26 S., R. 2 W., Sec 23 NW1/4, NW1/4)

The initial goal of treating the English ivy at Stick Beach is to contain the infestation and limit its spread. Initial control priorities would be to reduce the extent of English ivy on the north side of Highway 138, remove English ivy from the *B. viridis* log and within close proximity to the *B. viridis* log, and contain its extent on the south side of the highway. English ivy growing up tree boles should be cut at a height of 4-5 feet above the ground and the upper portions of the plants should be left in place to fall down naturally. After which the portions of the plants growing from the ground should be hand pulled. Herbicides should not be used due to the close proximity of the North Umpqua River. It is recommended that an area hand pulled on the south shoulder of the Highway 138 be revegetated to reduce the area of bare soil available for new noxious weed establishment. The English ivy infestation is especially heavy on the south side shoulder of Highway 138. Plant species used for revegetation should be very shade tolerant due to the heavy tree cover at the site.

- **North Umpqua River Sidebar Habitat**

    - Cable Crossing Park: Treat several species of noxious weeds.

    - Hill Creek Wayside, Swimming Hole: Treat moderately dense population of scotch broom.

    - Stick Beach: Treat scotch broom.

    - Bob Creek Outlet: Treat small amount of scotch broom.

    - Susan Creek Campground: Treat several species of noxious weeds.

F. Landslide Risk Areas

Prior to project level actions, more extensive on-the-ground investigations for slope stability on steep slopes (greater than 70 percent) needs to occur within the **SE area of Old Fairview (see Figure 5-3)**. Additionally, with on-the-ground investigations throughout all Old Fairview on steep slopes, the following locations, topographic positions and geology need greater attention with regard to slope stability:

- slightly below slope breaks with benches
-inner gorge slopes
-strongly convergent topographic positions
-soft, altered tuffaceous rock
-deeper soils (greater than 40 inches), especially those of low cohesion
- where stream channels are within reach of potential slides, especially if these streams have debris flow potentials
-scarps and incised stream positions in landslide-earth flow complexes
-sidecast of old roads
- toes of slumps and earth flows in the landslide-earth flow complexes (primarily a road construction consideration)

G. Road Risk Reduction

Use Figure 8-1 and Tables 8-1 and 8-3 as guides to address road-related issues that are affecting aquatic and/or wildlife values. Because roads have been identified as causing the majority of the aquatic impacts, road surveys were conducted to prioritize and identify road specific issues that will need to be addressed through management actions over the next 10 years as funds become available.

Old Fairview is estimated to have approximately 172 miles of road. This estimate takes into consideration all roads including roads on private lands. These roads can have direct and indirect impacts on aquatic habitat. BLM has full or partial control on 88 miles of these roads. Many of the BLM roads are intermingled with privately owned or controlled road segments. BLM roads were evaluated for their impacts to aquatics as well as their current and future human uses. This evaluation shows past rehabilitation efforts (Tables 8-2 and 8-4) as well as providing guidance for future restoration and rehabilitation work as represented in **Figure 8-1** and **Tables 8-1** and **8-3**.

For this watershed analysis, roads were placed in the following categories: high aquatic risk roads that had high human use associated with them (Treatment Candidates, approximately 20 miles) and high aquatic risk roads that had low to moderate human use associated with them (Decommission Candidates, approximately 5 miles). These were roads with portions having higher risk for road failures, erosion problem roads, or roads with stream crossing potential problems. Because some high risk roads also had high value for human uses, it is expected that they will be maintained as open but should be given higher priority for risk reduction road improvement work. From this list of roads engineers and an interdisciplinary (ID) team can develop more site specific road fixes.

A further step in this process is for the engineers and the ID team to further refine which roads would be proposed to Douglas Fire Protection Association (DFPA) and Right-of-Way (R/W) permittees for decommissioning. This process allows DFPA and R/W permittees to give their feedback for roads that they need for current and future access. An environmental assessment will also allow the public an opportunity to comment on a final list of roads proposed for decommissioning. In the planning process specific road problems should be addressed with geotechnical input as necessary. The following priorities need to be taken into consideration:

- Stream crossings with fish passage problems
- Stream crossings with 10 feet or more of fill over the tops of the culvert
- Stream crossings with potential for diverting water if the culvert is blocked
- Erosion sites and failures near streams
- Road drainage
- Erosion sites and failures away from streams (more than 200 feet)

There are some opportunities to treat and reduce aquatic risks on private roads within Old Fairview. Although the focus of this watershed analysis is for federal lands, actions on private lands can affect federal lands because of the intermixed land ownership. Because BLM has reciprocal right-of-ways for road construction or improvements on private lands, some roads that are privately controlled were included in this analysis. Any rehabilitation work on these roads would need the consent of private landowners as well as collaborative efforts through the Umpqua Basin Watershed Council.

Definitions for Tables 8-1 through 8-4

Surface Type

ABC = Aggregate Base Course
ASC = Aggregate Surface Course
PRR = Pit Run Rock
GRR = Grid Rolled Rock
NAT = Natural Surface Material or Dirt

Control = Ownership of the road

BL = BLM Ownership
PB = Private Ownership of Base Road, BLM Ownership of Improvements
BP = BLM Ownership of Base Road, Private Ownership of Improvements
PV = Private Ownership

Reason = Reason for the road decommission/closure recommendation

FSH = Fisheries/Aquatic Potential Impacts
(This reason is related to how the list above of stream crossings, road drainage, and erosion concerns are or could potentially impact fish and aquatics.)
WLD = Wildlife concerns
(This reason is related to minimizing disturbance in an elk calving area.)

Old Fairview 6th Field Watershed

Road Risk Reduction Opportunities

Figure 8-1

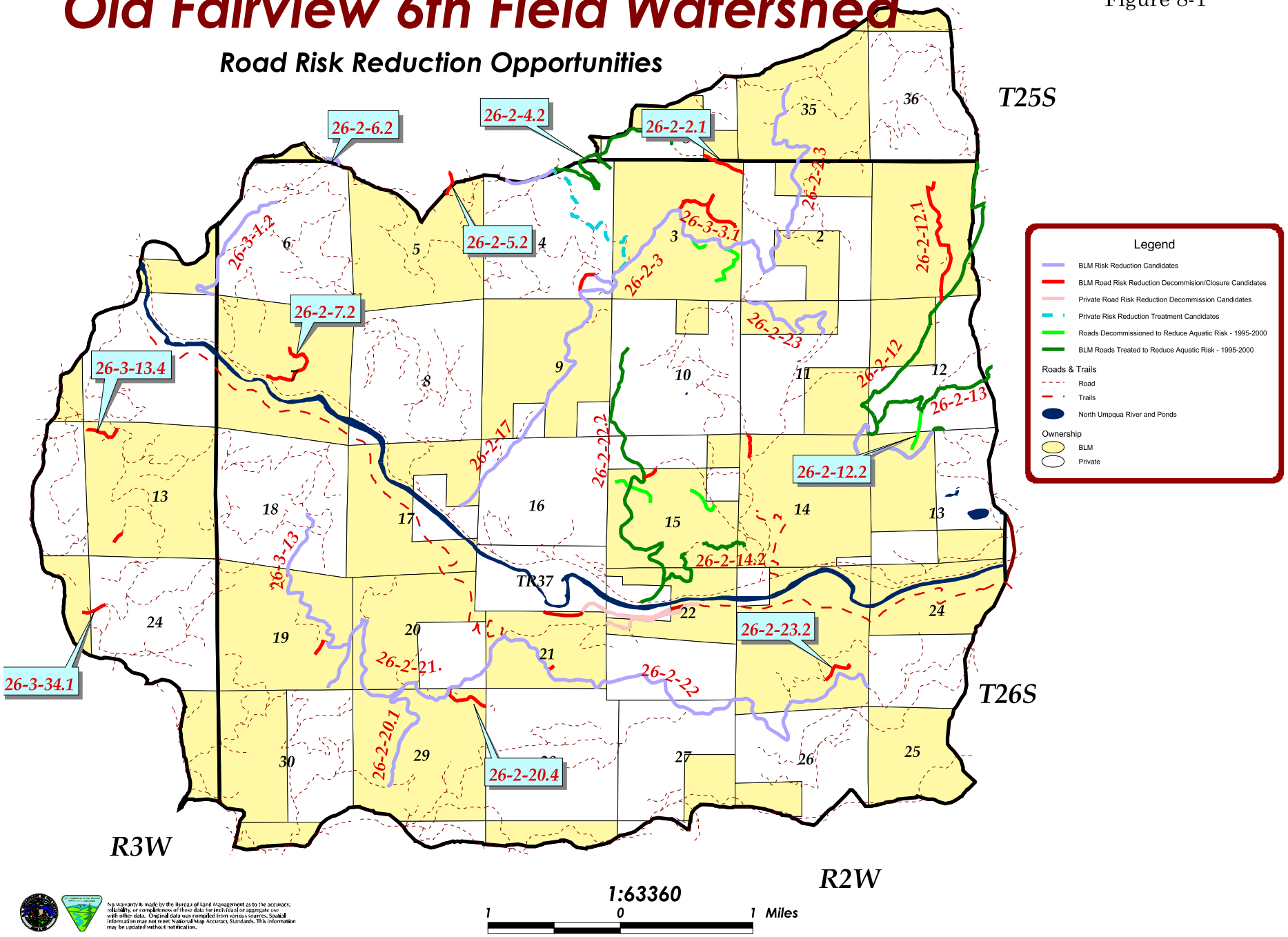


Table 8-1 Road Risk Reduction Treatment Candidates

ROUTE_ID	CONTROL	SURFACE TYPE	MILES
25 S 02 W 35.01A	BLM	GRR	0.1
25 S 02 W 35.01A1	BLM	ASC	0.2
26 S 02 W 02.02A	BLM	ASC	0.5
26 S 02 W 02.03A	BLM	ASC	0.8
26 S 02 W 02.03B	BLM	ASC	0.5
26 S 02 W 03.00A	BLM	ASC	1.3
26 S 02 W 03.07A1	PB	ASC	0.1
26 S 02 W 04.00A	PB	ASC	0.2
26 S 02 W 04.03A	PB	ASC	0.2
26 S 02 W 06.02A	BLM	ABC	0.1
26 S 02 W 13.00E	BLM	ABC	1.1
26 S 02 W 17.00B	BLM	ASC	0.2
26 S 02 W 17.00C	BLM	ASC	0.1
26 S 02 W 17.00D	PB	ASC	2.2
26 S 02 W 17.00E2	PB	ASC	0.2
26 S 02 W 19.02A	BLM	GRR	0.4
26 S 02 W 20.01A	BLM	ASC	1.1
26 S 02 W 21.00A	BLM	ASC	0.3
26 S 02 W 21.00B	PB	ASC	0.3
26 S 02 W 21.00C	BLM	ASC	0.4
26 S 02 W 21.00D1	BLM	ASC	0.9
26 S 02 W 21.00D2	BLM	ASC	0.1
26 S 02 W 21.00D3	BLM	ASC	0.5
26 S 02 W 22.00C	BLM	ASC	1.0
26 S 02 W 22.00D	PB	ASC	0.8
26 S 02 W 22.00E	PB	ASC	0.4
26 S 02 W 22.00F	PB	ASC	0.8
26 S 02 W 22.00G	PB	ASC	0.9
26 S 02 W 23.00E1	BLM	PRR	0.5
26 S 02 W 23.00F	BLM	ASC	0.5
26 S 02 W 23.00G2	PB	ASC	0.1
26 S 02 W 23.00G3	PB	ASC	0.2
26 S 02 W 23.00H	BLM	ASC	0.3
26 S 03 W 01.02A	PB	PRR	1.2
26 S 03 W 13.00E	PB	ASC	0.5
26 S 03 W 13.00F	BLM	ASC	0.9
TOTAL			19.6
PRIVATE CONTROLLED ROADS SUGGESTED RISK REDUCTION			
26 S 02 W 17.00E1	PVT	NAT	1.4
TOTAL			21.0

Table 8-2 Roads Treated to Reduce Aquatic Risk, 1995 - 2001

ROUTE_ID	CONTROL	MILES
26 S 02 W 02.01	PVT	1.0
26 S 02 W 04.02A	PVT	0.1
26 S 02 W 04.02A	PVT	0.1
26 S 02 W 04.02A	PVT	0.8
26 S 02 W 12.00A	PB	0.1
26 S 02 W 12.00B	BLM	0.1
26 S 02 W 12.00B	BLM	0.0
26 S 02 W 12.00B	BLM	0.0
26 S 02 W 12.00B	BLM	0.4
26 S 02 W 12.00B	BLM	0.5
26 S 02 W 12.00B	BLM	0.4
26 S 02 W 12.00B	BLM	0.2
26 S 02 W 12.00B	BLM	1.0
26 S 02 W 13.00D2	PB	0.1
26 S 02 W 13.00E	BLM	1.1
26 S 02 W 13.00F1	PB	0.1
26 S 02 W 13.00F2	PVT	0.2
26 S 02 W 13.00F2	PVT	0.4
26 S 02 W 13.00F2	PVT	0.2
26 S 02 W 13.00F2	PVT	0.6
26 S 02 W 14.02A	BLM	0.4
26 S 02 W 22.02A	BLM	1.2
26 S 02 W 22.02A	BLM	0.2
26 S 02 W 22.02A	BLM	1.2
26 S 02 W 22.02A1	BLM	0.3
TOTAL		10.3

Table 8-3 Road Risk Reduction Decommission/Closure Candidates

ROUTE_ID	CONTROL	SURFACE TYPE	REASON	MILES
DECOMMISSION CANDIDATES				
26 S 02 W 22.01A1	BLM	NAT	FSH	0.1
26 S 02 W 22.01C	BLM	NAT	FSH	0.3
26 S 02 W 02.01B	BLM	NAT	FSH	0.3
26 S 02 W 05.02A	BP	NAT	FSH	0.2
26 S 02 W 03.02A	BLM	NAT	FSH	0.1
26 S 02 W 03.01A	BLM	NAT	FSH	0.6
26 S 02 W 17.00D	PB	ASC	FSH	0.2
26 S 02 W 07.02A	BLM	NAT	FSH	0.6
26 S 03 W 13.04A	BLM	NAT	FSH	0.1
26 S 03 W 13.04B	BLM	NAT	FSH	0.2
26 S 02 W 14.01A	BLM	NAT	FSH	0.2
26 S 02 W 14.00F	BLM	NAT	FSH	0.1
26 S 03 W 13.03A	BLM	NAT	FSH	0.1
26 S 03 W 34.01G	BLM	NAT	FSH	0.1
26 S 03 W 34.01G	BLM	NAT	FSH	0.1
26 S 02 W 19.00A	BLM	NAT	FSH	0.1
26 S 02 W 21.02A	BLM	ASC	FSH	0.1
26 S 02 W 23.02A	BLM	ASC	FSH	0.3
26 S 02 W 20.04B	BLM	NAT	FSH	0.4
CLOSURE CANDIDATES				
26 S 02 W 12.01A	BLM	ASC	WLD	1.1
PRIVATE ROADS SUGGESTED DECOMMISSION CANDIDATES				
26 S 02 W 22.00A	PVT	PRR	FSH	0.8
26 S 02 W 22.01B	PVT	NAT	FSH	0.2
26 S 02 W 22.01A2	PVT	NAT	FSH	0.5
TOTAL				6.8

Table 8-4 Roads Decommissioned to Reduce Aquatic Risk, 1995 - 2001

ROUTE_ID	CONTROL	SURFACE TYPE	REASON	MILES
26 S 02 W 03.03A	BLM	NAT	FSH	0.1
26 S 02 W 03.00B	BLM	NAT	FSH	0.4
26 S 02 W 12.02A	PB	NAT	FSH	0.2
26 S 02 W 12.02B	BLM	NAT	FSH	0.2
26 S 02 W 15.02A	BLM	NAT	FSH	0.1
26 S 02 W 15.03A	BLM	NAT	FSH	0.2
26 S 02 W 15.01A	BLM	NAT	FSH	0.3
26 S 02 W 14.02B1	BLM	NAT	FSH	0.5
TOTAL				2.1

H. Instream Enhancement

As highest priority within Old Fairview, actively develop and implement instream enhancement projects for lower Susan and Bob Creeks as a step towards improving aquatic habitat and fisheries. This does not compare prioritization of this particular restoration against other instream restoration outside this subwatershed. Other stream reaches within the North Umpqua sub-basin may be higher priority. Within Old Fairview, however, current ODFW habitat surveys indicate that these streams rate as "Fair." By enhancing some features of the habitat quality indicators, these reaches could be eventually upgraded to "Good." All of these reaches are lacking in LWD, pool frequency, off-channel habitat, and refugia. Based on information in the HYDROLOGY, WATER QUALITY, and AQUATICS section, lower Susan Creek currently appears to have the highest restoration potential of the streams surveyed within Old Fairview. Lower Bob Creek should receive second priority for instream enhancement. Instream habitat enhancement is currently not recommended for Honey Creek, because the high fine sediment load is likely to compromise any effort to locally enhance instream habitat in this creek. Other stream reaches that could benefit from instream habitat projects include the lower portions of Unnamed Creeks B and C.

I. Land Exchange, Conservation Easements

Evaluate and develop cooperative public-private agreements that enhance the connectivity and long-term restoration potential of existing floodplain, side bar, and mid-channel habitats within the vicinity of Lower Bob and Susan Creeks.
The North Umpqua River Analysis showed that within the Middle North Umpqua watershed there is very little (2.2%) side channel habitat (pg 30). This habitat is valuable for anadromous fish and plays a key role in the rearing life stage, especially for coho. The area around the confluence of the North Umpqua and Bob Creek contains a combination of floodplain, side bar, and mid-channel habitat, unique within the Middle

North Umpqua watershed. Purchasing conservation easements or acquiring land in this area may protect these habitats, enhance habitat connectivity and increase the long-term restoration potential of the watershed. Similarly, purchasing conservation easements or acquiring land within the vicinity of Lower Susan Creek, particularly in Sections 23, 11 and 2, will enhance both terrestrial and aquatic habitat connectivity and increase the long-term restoration potential of the Susan Creek drainage.

J. Recreation

Update the Recreation Area Management Plan (RAMP). Although many of the recommendations sited in the RAMP have already been completed or are no longer applicable, there is still a need to bring the Recreation Area Management Plan and ACEC into concurrence with the current Roseburg District RMP.

Pros and Cons of a Suspension Footbridge Crossing North Umpqua River near Susan Creek

The Tioga section of the North Umpqua River Trail is approximately 16 miles long. Because of the length, very few people actually hike the entire trail, preferring to hike out and back from either one end or the other. If a hiking bridge were constructed at Susan Creek, a point about midway between the two trailheads, it would accomplish the following purposes:

- Allow more people to hike point-to-point on this section of trail
- Allow people using the Susan Creek Campground and Picnic Area to cross the river and hike the North Umpqua Trail as a part of their Susan Creek recreation experience
- Provide fishing access for the south side of the river
- Provide easier access for trail maintenance
- Divert some of the recreation away from both the Swiftwater Trailhead area and from the north side of the river
- Provide a midpoint access for emergencies (which is a public concern).

The construction of this bridge could have the following negative impacts:

- Divert more recreation into a threatened and endangered species area
- Give fishermen access to the south side of the river resulting in more disturbed riparian areas on the south side of the river
- Upset some public groups that do not want to see any more development along the North Umpqua River.

K. Monitoring And Data Gaps

The guidance for monitoring comes first from federal laws (i.e. Clean Water Act) and then from the program plans (i.e. NFP/Roseburg District RMP). Because the mainstem North Umpqua River is listed for temperature there is a legal obligation to provide data

tracking changes over time and influence of BLM land management activities. The first recommendation is tied to that legal obligation.

1. Stream Temperature

Will current and future management activities maintain riparian shade and thus contribute to stream temperatures maintaining the water quality standard of 17.8° C (64° F)?

Maintain stream temperature monitoring sites listed below and monitor riparian vegetation in future iterations of watershed analysis. The Roseburg District, with our cooperators, will continue to monitor stream temperatures in the Middle North Umpqua. The main monitoring objectives are to track long-term temperature recovery and better understand the natural temperature variability. **Table 8-5** within Old Fairview and **Figure 6-1** within Middle North Umpqua show sites that have been monitored in the past and which sites BLM will monitor in the future. The temporary sites will characterize stream temperatures in small tributaries and will probably be discontinued within the next couple years.

Table 8-5 Temperature Sites and Monitoring Status

Site Name (Legal Description)	District Responsible	Period of Record	Permanent Sites	Temporary Sites
Susan Creek (T26S, R2W, Sec 23)	Roseburg BLM	1999-2000		X
Honey Creek (T26S, R2W, Sec 17)	Roseburg BLM	1999-2000		X
North Umpqua Below Rock Creek (T26S, R3W, Sec 1)	USGS	1993-2000	X	

This watershed analysis also portrays the current vegetative conditions as shown in Figures 1-6, 3-1, 3-2, 7-2 and Table 3-1, 3-2, and 3-3. Future iterations of watershed analyses will also provide a context for changes in riparian forests and their ability to maintain and/or improve shading and supply large wood to the streams. Riparian vegetation will be characterized by age class in each of these future iterations as an indicator of riparian shading.

2. Implementation and Effectiveness Monitoring

The NFP/Roseburg District RMP as well as the North Umpqua River Management Plan (NURMP) provide guidance for monitoring in the Middle North Umpqua watershed. Implementation and effectiveness monitoring are part of the NFP and the Roseburg District RMP. These types of monitoring will provide information as to whether standards and guidelines are being met, and if management actions are achieving the desired results. For Implementation Monitoring, the Roseburg District's Annual Program Summary and Monitoring Report tracks how management actions are being implemented

according to standard and guidelines. It also outlines the progress of watershed restoration work.

Effectiveness monitoring tests the effectiveness of the NFP/RMPs and is being developed at the district, province, and regional scale. As described on page 196 of the Roseburg District Record of Decision and RMP, this type of monitoring is meant to determine if the current land use allocations and best management practices on federal lands are improving ecosystem function and water quality, especially related to basin specific State water quality criteria.

Pages 41-47 of the NURMP also provide a comprehensive monitoring plan for the North Umpqua Wild and Scenic Corridor. There is overlap between this monitoring plan and the types of monitoring that would take place under the Roseburg District RMP (both implementation and effectiveness). The monitoring in the NURMP will not be repeated here, however, an initial recommendation would be the following:

3. Strategic Monitoring Plan

Work with other land management and regulatory agencies in the North Umpqua to develop an overarching sub-basin wide strategic monitoring plan that meets the overlapping direction of all the guiding legal obligations and plans. This monitoring plan could be developed in coordination with a Water Quality Management Plan as required under the Clean Water Act for listed streams.

The following are key questions/issues specific to the Old Fairview subwatershed and the types of monitoring that could provide feedback for potential future changes in management direction. These suggestions are applied to Middle North Umpqua/Old Fairview and would need to be incorporated into the broader strategic monitoring plan.

a) Biological Monitoring

Will best management practices, rehabilitation and restoration activities lead to a recovery in biological integrity?

Establish long-term aquatic macroinvertebrate sampling sites near the mouths of Susan, Honey and Bob Creeks. Ancillary pebble count and percent embeddedness data should be collected coincident with macroinvertebrate sampling at each site.

b) Instream and Riparian Enhancement Projects

Are measurable improvements in aquatic habitat observed after instream and riparian enhancement projects are completed?

At a minimum, the following information needs to be collected prior to and following any instream enhancement work to provide adequate feedback as to whether objectives are being met:

- a map of instream habitat unit types and areas throughout the targeted stream reaches
- a longitudinal bed profile of the stream reach
- **a distribution map of existing and introduced large instream wood**

c) Continue weekly spawning surveys on Susan Creek during winter months.

This specific reach was assumed by BLM personnel from the Oregon Department of Fish and Wildlife in the early to mid 1990's. This stream reach's productivity directly correlates with information collected at Winchester Dam, giving an indication as to the health of the entire North Umpqua watershed.

4. Recreation Uses

Within the monitoring described in the NURMP, emphasis is given for monitoring the amount and types of recreation uses. It is recommended that these continue.

Is a balance in quality and quantity of recreation uses within the Middle North Umpqua watershed being maintained?

Continue to monitor various recreation uses as given on pages 44-45 of the NURMP.

9 REEFERENCES

A. Vegetation

1. Fire

Agee. J.K.1993 Fire Ecology of Pacific Northwest forests. Island Press. Washington D.C.

USDA. Umpqua National Forest. 2001 Middle North Umpqua Watershed Analysis (USFS)

Stillwater Sciences. 2000. North Umpqua cooperative watershed analysis Vol 3. FERC Project N0.1927. Prepared for Pacific Corp. (page 2-4).

2. Silviculture

Agee. James K. 1995. "Fire Ecology of Pacific Northwest Forests". Island Press.

Carey. A.B. and M.L.Johnson. 1995. Small mammals in managed. naturally young. and old-growth forests. Ecological Applications 5:336-352.

Hann. D. *et al.* 1995. Version 5.0 of the Organon Growth Model. Oregon State University.

Oliver. Chadwick D. and Bruce C. Larson. 1991. "Forest Stand Dynamics". McGraw-Hill.

Ritchie. Marin W. and Robert F. Powers. 1993. User's Guide to SYSTUM-1 (Version 2.0): A Simulator of Growth Trends in Young Stands Under Management in California and Oregon. General Technical Report PSW-GTR-147.

RROD RMP. 1995. Roseburg District Record of Decision and Resource Management Plan. June 1995.

USDA. USDI 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. U.S.G.P.O.:1994 - 589-111/00001. This document is on file at the Roseburg District Office of the Bureau of Land Management. The alternative selected in the ROD is also called the Northwest Forest Plan (NWFP).

Spies. T.S. and J.F. Franklin. 1991. The structure of natural young. mature. and old-growth Douglas-fir forests in Oregon and Washington. Pages 19-121 in:Rugiero. L.F. K.B. Aubry. A.B. Carey. M.H. Juff (tech.coords). Wildlife and Vegetation on

Unmanaged Douglas-fir Forests. Gen. Tech. Rep. GTR-PNW-285. USDA Forest Service. Pacific Northwest Research Station. Portland. OR.

Ursitti. V.L. 1991. Riparian vegetation and abundance of woody debris in streams of Southwestern Oregon. Masters thesis. Oregon State University. Corvallis. OR. page 115.

3. Botany

US Departments of Agriculture and the Interior. 2001. Record of Decision (ROD) and Standards and Guidelines for Amendments to the Survey and Manage. Protection Buffer. and other Mitigation Measures Standards and Guidelines. Portland OR.

USDI Bureau of Land Management 1986. Northwest Area Noxious Weed Control Program Record of Decision (ROD). Portland OR.

USDI Bureau of Land Management 1987. Supplement to the Northwest Area Noxious Weed Control Program Record of Decision (ROD). Portland OR.

USDI Bureau of Land Management 1995a. Record of Decision (ROD) and Resource Management Plan. Roseburg OR.

USDI Bureau of Land Management 1995b. Integrated Weed Control Plant Environmental Assessment. Roseburg OR.

USDI Bureau of Land Management 1996. Partners Against Weeds. An Action Plan For the Bureau of Land Management Washington DC.

B. Wildlife

Altman. B. Conservation Strategy For Landbirds In Lowlands And Valleys Of Western Oregon And Washington. American Bird Conservancy. 18000 SE Vogel Road. Boring. Oregon 97009. version 1.0. March. 2000.

Bailey. V. B. The Mammals And Life Zones Of Oregon. North American Fauna No. 55. United States Department of Agriculture. Bureau of Biological Survey. Washington D.C. June 1936.

Brown. E. R. et. al. Management Of Wildlife And Fish Habitats In Forests Western Oregon And Washington. USDA Forest Service. Pacific Northwest Region. June 1985.

Carey. A. B. David R. Thysell. and Angus W. Brodie. The Forest Ecosystem Study: Background. Rationale. Implementation. Baseline Conditions. And Silvicultural

Assessment. May. 1999. US Department of Agriculture. Forest Service Pacific Northwest Research Station. General Technical Report PNW-GTR-457.

Carey. A. B. and Johnson M. L. Small Mammals In Managed. Natural Young. And Old-Growth Forests. Ecological Applications. 5(2). 1995. pp. 336-352. 1995 by the Ecological Society of America.

Carey. A. B. Wilson. T. M. Maguire. C. C. and Biswell. B. Dens Of Northern Flying Squirrels In The Pacific Northwest. Journal of Wildlife Management. 61(3):664-699.

Carey. A. B. Kershner. J. Biswell. B. and Dominguez De Toledo. L. Ecological Scale And Forest Development: Squirrels. Dietary Fungi. And Vascular Plants In Managed And Unmanaged Forests. The Wildlife Society. Wildlife Monograph No. 142. January. 1999.

Carey. A. B. Wildlife Associated With Old-Growth Forests In The Pacific Northwest. Natural Areas Journal. Vol. 9(3). 1989.

Carey. A. B. Elliott. C. Lippke. B. R. et. al. Washington Forest Landscape Management Project– A Pragmatic. Ecological Approach to Small Landscape Management. Washington State Department of Natural Resources. Washington Forest Landscape Management Project. Report No. 2. 1996.

Carey. A. B. Interactions Of Northwest Forest Canopies And Arboreal Mammals. Northwest Science. Vol. 70. Special Issue. (1996) p. 72-78.

Carey. A. B. Lippke. B. R. and Sessions. J. Intentional Systems Management: Managing Forests For Biodiversity. Journal of Sustainable Foresty. Vol. 9(3/4) 1999.

Carey. A. B. The Biology Of Arboreal Rodents In Douglas-Fir Forests. USDA Forest Service. PNW General Technical Report. PNW-GTR-276. Nov. 1991.

Carey. A. B. Effects Of New Forest Management Strategies On Squirrel Populations. Ecological Applications. 10(1). 2000. pp. 248-257.

Cazares. E. Effects Of Commercial Thinnings On Ectomycorrhizal Fungi. Unpublished abstract. pers. Communication. Jan. 2001.

Clifton. P. L. Biology And Life History Of The Dusky Tree Mouse. Phenacomys Silvicola. (HOWELL). Master of Arts thesis. Walla Walla College. August. 1960.

Cline. S. P. The Characteristics And Dynamics Of Snags In Douglas-Fir Forests Of The Oregon Coast Range. Thesis. Master of Science. Forest Science. June 14. 1977.

Colgan. W. III. Carey. A. B. Trappe. J. A. Molina. R. and Thysell. D. Diversity And Productivity Of Hypogeous Fungal Sporocarps In A Variably Thinned Douglas-Fir Forest. Canadian Journal of Forest Resources. 29: 1259-1268 (1999).

Cross. Stephen P. Responses Of Small Mammals To Forest Riparian Perturbations. paper presented at the North American Riparian Conference. University of Arizona. Tucson. April 16-18. 1985.

Cross. S. P. and Waldien. D. Survey Of Bats And Their Habitats In The Roseburg District Of The BLM In 1994. Department of Biology. Southern Oregon State College. Ashland. Oregon 97520. January 24. 1995.

Edmonds. R. L. Binkley. D. Feller. M. C. Sollins. P. Abee. A. and Myrold. D. D. Nutrient Cycling: Effects On Productivity Of Northwest Forests. Maintaining the long-term productivity of Pacific Northwest Forest Ecosystems. Perry. D. A. ed. [et al.]. Portland. OR: Timber Press; 1989. 256p. chapter 2.

Franklin. J. F. et. al. Interim Definitions For Old-Growth Douglas-Fir And Mixed-Conifer Forests In The Pacific Northwest And California. USDA Pacific Northwest Research Station Note: PNW-447. July. 1986.

Gillesberg. A. and Carey. A.B. Arboreal Nests Of Phenacomys Longicaudus In Oregon. Journal of Mammalogy. 72(4):784-787. 1991.

Gomez. Douglas. M. Small Mammal And Herpetofauna Abundance In Riparian And Upslope Areas Of Five Forest Conditions. Masters thesis. Wildlife Science. Oregon State University. May 1. 1992.

Harr. R. D. Fog Drip In The Bull Run Municipal Watershed. Oregon. Water Resources Bulletin. American Water Resources Association. Vol. 18. No. 5. October 1982

Haveri. B. A. and Carey. A. B. Forest Management Strategy. Spatial Heterogeneity. And Winter Birds In Washington. Wildlife Society Bulletin 2000. 28(3):643-652.

Hayes. J. P. Chan. S. S. et. al. Wildlife Response To Thinning Young Forests In The Pacific Northwest. Journal of Forestry. Vol. 95. No. 8. August 1997.

Howell. A. B. Voles Of The Genus Phenacomys. I. Revision Of The Genus Phenacomys. Ii. Life History Of The Red Tree Mouse (Phenacomys Longicaudus). North American Fauna No. 48. U.S. Department of Agriculture. Bureau of Biological Survey. Washington Government Printing Office. October 12. 1926.

Irwin. L. L. and Rock. D. F. Stand Structures Used By Northern Spotted Owls In Managed Forests. Journal of Raptor Research. 34(3): 175-186. 2000. The Raptor Research Foundation. Inc.

Mannan. R. W. Use Of Snags By Birds. Douglas-Fir Region. Western Oregon. Thesis. Master of Science. Fisheries and Wildlife. Oregon State University. March 16.1977.

Maser. C. and Trappe. James M. The Seen And Unseen World Of The Fallen Tree. Pacific Northwest Forest and Range Experiment Station. U.S. Dept. of Agriculture. Forest Service. General Technical Report PNW-164. March 1984.

Morrison. M. L. and Meslow. E. C. Avifauna Associated With Early Growth Vegetation On Clearcuts In The Oregon Coast Ranges. USDA Forest Service. PNW Forest and Range Experiment Station. Research Paper PNW-305. March. 1993

Oliver. C. D. and Larson. B. C. Forest Stand Dynamics. Update Edition. John Wiley & Sons. Inc. 1996.

Peck. J. E. and McCune. B. Remnant Trees And Canopy Lichen Communities In Western Oregon: A Retrospective Approach. Ecological Applications. 7(4). 1997. pp. 1181-1187.

Tappeiner. J. C. Huffman. D. Marshall. D. Spies. T. A. and Bailey. J. D. Density. Ages And Growth Rates In Old-Growth And Young-Growth Forests In Coastal Oregon. Canadian Journal of Forest Resouces. 1997.

Thysell. D. R. and Carey. A. B. Effects Of Forest Management On Understoryand Overstory Vegetation: A Retrospective Study. USDA Forest Service. PNW General Technical Report. PNW-GTR-488. March 2000.

USDI. Final: Roseburg District Timber Management Environmental Impact Statement. Bureau of Land Management. Oregon State Office. May. 1983

USDI Roseburg Timber Management Plan Decision. Bureau of Land Management. Roseburg District Office. September 30. 1983.

USFS. USDI. North Umpqua River Management Plan; A wild and Scenic River Management Plan Developed Jointly by: U.S. Dept. of Agriculture. Forest Service. Pacific Northwest Region. Umpqua National Forest and U.S. Dept. of the Interior. Bureau of Land Management. Roseburg District. July. 1992.

USFWS. Endangered And Threatened Wildlife And Plants; Determination Of Critical Habitat For The Northern Spotted Owl; Final Rule. Federal Register Notice. Wednesday. January 15. 1992. Part II. U.S. Department of the Interior.

Wilson. S. M. and Carey. A. B. Legacy Retention Versus Thinning: Influences On Small Mammals. Northwest Science. Vol. 74. No 2. 2000.

Zobel. D. B. McKee. A. Hawk. G. M. and Dyrness. C. T. Relationships Of Environment To Composition. Structure. And Diversity Of Forest Communites Of The Central Western Cascades Of Oregon. reprinted from Ecological Monographs. Vol. 46. No. 2. Spring 1976. pp. 135-156.

C. Geology/Soils

Benda, Lee E. and Terrance W. Cundy. Predicting Deposition Of Debris Flows In Mountain Channels. Can. Geotech. Journal. 27:1990, pp. 409 - 417.

National Cooperative Soil Survey of Douglas County by the USDA Natural Resource Conservation Service, unpublished.

Robison, George E. et al. Oregon Department of Forestry Storm Impacts and Landslides of 1996: Final Report. 1999.

USDA, Umpqua National Forest. 2001 Middle North Umpqua Watershed Analysis (USFS).

D. Hydrology

Baker and Medina. 1997. "Fisheries and Stream Restoration in the Southwest: A Critical Review." Symposium Proceedings from the American Water Resources Association conference.

Beschta. R. L. et. al. 1987. "Stream Temperature and Aquatic Habitat: Fisheries and Forestry Interactions." in *Streamside Management: Forestry and Fishery Interactions*. pp. 191-232. Contr. No. 57. Inst. Forest Resources. University of Washington.

Beschta. Platts. Kauffman and Hill. 1994. "Artificial Stream Restoration: Money Well Spent or an Expensive Failure?". proceedings from the Universities Council on Water Resources. Annual Meeting. August 2-5.

BLM. 1989. *Riparian Area Management: Inventory and Monitoring of Riparian Areas.* TR 1737-3.

BLM. 1999. *Inventory & Monitoring System: Current Vegetation Survey Field Procedures.* Version 3.01.

Coffin. B. A. and R. D. Harr. 1992. *Effects of Forest Cover on Volume of Water Delivery to Soil During Rain-On-Snow.* Pacific Northwest Research Station. Final Report for Project SH-1.

Cubbage. Frederick W. "The Public Interest In Private Forests: Developing Regulations And Incentives." in *Creating a Forestry for the 21st Century*. 1997.

DEQ. 1988(a). *Water Quality Limited Streams 303(d) List. Final 1998 303(d) Database.* http://waterquality.deq.state.or.us/WQLData/SearchChoice98.htm.

DEQ. 1988(b). *Listing Criteria For Oregon's 1998 303(D) List Of Water Quality Limited Water Bodies.* Oregon State Department of Environmental Quality.

DeShon. Jeffrey E. 1995. "Development and Application of the Invertebrate Community Index (ICI)." in *Biological Assessment and Criteria.* Wayne Davis and Thomas Simon eds. CRC Press.

Doberstein. Craig P. et. al. "The Effect of Fixed-County Subsampling on Macroinvertebrate Biomonitoring in Small Streams." in *Freshwater Biology.* 44. 2000. 1-17.

Dose. Jeffrey J. and Brett B. Roper. December. 1994. "Long-Term Changes in Low-Flow Channel Widths Within the South Umpqua Watershed. Oregon." in *Water Resources Bulletin.* Vol. 30. No. 6. pp. 993-1000.

Franklin. Berg. Thornburgh. and Tappeiner. 1997. "Alternative Silvicultural Approaches to Timber Harvesting: Variable Retention Harvest Systems." in *Creating a Forestry for the 21st Century*.

Forest Ecosystem Management Assessment Team (FEMAT). 1993. *forest Ecosystem Management: An Ecological. Economic and Social Assessment.*

Gregory. Stanley V. et. al. September. 1991. "An Ecosystem Perspective of Riparian Zones." *BioScience.* Vol. 41. No. 8. pp 540-551.

Gregory. Stanley. 1997. "Riparian Management for the 21st Century." in *Creating a Forestry for the 21st Century*.

Harr. Dennis R. et. al. February. 1979. *Changes in Streamflow.* Pacific Northwest Forest and Range Experiment Station. Research Paper PNW-249.

Harris. D.D. 1977. *Hydrologic changes after logging in two small Oregon coastal watersheds.* Water Supply Paper 2037. Washington. DC: Geological Survey. U.S. Department of the Interior.

Holtby. L. B. 1988. "Effects of Logging on Stream Temperatures in Carnation Creek. British Columbia. and Associated Impacts on the Coho Salmon (*Oncorhynchus kisutch*). *Can. J. Fish. Aquat. Sci.* 45: 502-515.

Jones. Mikeal. et. al. 1990. *Standard and Guideline Procedures for Watershed Cumulative Effects and Water Quality.* USFS. Umpqua National Forest.

King. J. C. and L. C. Tennyson. 1984. "Alteration of Streamflow Characteristics Following Road Construction in North Central Idaho." *Water Resources Research* 20 (8): 1159-1163.

MacDonald. Lee H. et. al. 1991. *Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska.* University of Washington. Center for Streamside Studies.

Megahan. W. F. 1971. "Subsurface Flow Interception by a Logging Road in the Mountains of Central Idaho." presented at the National Symposium on Watersheds in Transition. American Water Resources Association and Colorado State University. pp. 350-356.

Moring. J. R. 1975. *The Alsea Watershed Study: Effects of Logging on the Aquatic Resources of Three Headwater Streams of the Alsea River. Oregon.* Fish Res. Rep. 9. Oregon Dept of Fish and Wildlife.

Naiman. Robert J. and Robert E. Bilby. eds. 2001. "Riparian Forests." in *River Ecology and Management: Lessons from the Pacific Coastal Ecoregion*.

Oregon State Department of Fish and Wildlife (ODFW). 1993. *Umpqua Basin Aquatic Habitat Surveys. North Umpqua River Basin. Tributaries Vol. #1.* Umpqua Basin Fisheries Restoration Initiative.

Oregon State Department of Fish and Wildlife (ODFW). 1994. *Umpqua Basin Aquatic Habitat Surveys. North Umpqua River Basin. Tributaries Vol. #2.* Umpqua Basin Fisheries Restoration Initiative.

Pack. R. T. D. G. Tarboton. and C. N. Goodwin. 2001. "Assessing Terrain Stability in a GIS Using SINMAP." presented at the 15th Annual GIS Conference. February 19-22. Vancouver. British Columbia.

Risley. John C. 1994. *Use of a precipitation-runoff model for simulating effects of forest management on streamflow in 11 small drainage basins*. Oregon Coast Range. USGS Water Resources Investigations Report 93-4181.

Thomas. Robert B. and Walter F. Megahan. 1998. "Peak Flow Responses to Clear-Cutting and Roads in Small and Large Basins. Western Cascades. Oregon: A Second Opinion." *Water Resources Research.* Vol. 34. No. 12. pp. 3393-3403.

US Bureau of Land Management. Roseburg District Office. June. 1995. *Record of Decision and Resource Management Plan (RMP).*

US Forest Service. 2001. *Middle North Umpqua Watershed Analysis.*

Water Quality Monitoring Team (WQMT). *Oregon Plan for Salmon and Watersheds Water Quality Monitoring Guidebook.* 1997.

Wemple. B. C. 1994. *Hydrologic Integration of Forest Roads with Steam Networks in Two Basins. Western Cascades. Oregon.* MS Thesis. Oregon State University. Corvalllis. OR.

10 APPENDIX A - BOTANY

Table A-1 Special Status vascular and nonvascular plant species that may occur

SPECIES	HABITAT	BUREAU STATUS
Fungi		
Choiromyces alveolatus	In soil under trees	TRACKING[15]
Glomus pubescens	In soil under trees	TRACKING
Gymnomyces monosporus	In soil under trees	TRACKING
Nolanea verna var. isodiametrica	On ground mainly under conifers	TRACKING
Pithya vulgaris	On dead *Abies* branches	TRACKING
Rhizopogon brunneiniger	In soil under trees	TRACKING
Rhizopogon flavofibrillosus	In soil under trees	TRACKING
Lichens		
Sulcaria badia	Apple, oak, and maple trees at low elevations	SENSITIVE[16]
Vezdaea stipitata	Crust, develops on lichens and mosses	TRACKING
Bryophytes		
Crumia latifolia	Riparian rocks or soil often calcareous	ASSESSMENT[17]
Funaria muhlenbergii	On soil often calcareous	ASSESSMENT
Tripterocladium leucocladulum	On soil, rocks, or trees	ASSESSMENT
Tritomaria exsectiformis	On logs	ASSESSMENT
Vascular Plants		
Adiantum jordonii	Rock outcrops, riparian	TRACKING
Allium bolanderi var. mirabile	Forests, meadows	TRACKING
Arabis koehleri var. koehleri	Rock outcrops	SENSITIVE
Asplenium septentrionale	Rock outcrops	ASSESSMENT
Astragalus umbraticus	Forests	TRACKING
Calochortus coxii	Forests, meadows	SENSITIVE
Cicendia quadrangularis	Meadows	ASSESSMENT
Cimicifuga elata	Forests, shrub thickets	SENSITIVE
Dichelostemma ida-maia	Forests, meadows, roadsides	TRACKING

[15] Tracking = Collect information to determine status. No active management required.
[16] Sensitive = Species that are Oregon state critical, Washington state sensitive, or Oregon Natural Heritage Program List 1. Bureau actions will not contribute to need to list species.
[17] Assessment = Species not federally or state listed but are of concern and may need protection or mitigation.

Epilobium luteum	Marsh, wet meadows	TRACKING
Euonymus occidentalis	Forests	TRACKING
Frasera umpquaensis	Forests, meadows	SENSITIVE
Helianthella californica	Meadows, shrub thickets	TRACKING
Horkelia congesta ssp. congesta	Forests, meadows	SENSITIVE
Iliamna latibracteata	Shrub thickets	ASSESSMENT
Isopyrum stipitatum	Forests	ASSESSMENT
Kalmiopsis fragrans	Forests, rock outcrops	SENSITIVE
Lewisia cotyledon var. howellii	Rock outcrops	TRACKING
Linanthus bakeri	Meadows, forests	TRACKING
Lupinus sulphureus var. kincaidii	Forests, meadows	Threatened (federally listed)
Mimulus douglasii	Forests, meadows	TRACKING
Mimulus kelloggii	Meadows	TRACKING
Mimulus tricolor	Meadows	ASSESSMENT
Minuartia californica	Meadows	TRACKING
Montia diffusa	Forests, shrub thickets	TRACKING
Montia howellii	Meadows, rock outcrops	SENSITIVE
Navarretia tagetina	Open areas	TRACKING
Ophioglossum pusillum	Wet meadows	ASSESSMENT
Pellaea andromedaefolia	Rock outcrops	ASSESSMENT
Perideridia erythrorhiza	Meadows	SENSITIVE
Perideridia howellii	Forests, wet meadows	TRACKING
Plagiobothrys hirtus	Wet meadows	Endangered (federally listed)
Scirpus subterminalis	Aquatic	ASSESSMENT
Sedum spathulifolium ssp. purdyi	Rock outcrops	TRACKING
Sidalcea cusickii	Wet meadows	TRACKING
Sisyrinchium hitchcockii	Forests, meadows	SENSITIVE
Spirodela punctata	Aquatic	TRACKING
Utricularia gibba	Aquatic	ASSESSMENT
Utricularia minor	Aquatic	ASSESSMENT
Verbena hastata	Wet meadow	TRACKING
Wolffia borealis	Aquatic	ASSESSMENT
Wolffia columbiana	Aquatic	ASSESSMENT

Table A-2 Survey and Manage category "A" and "C" plant species that may occur

Lichens	**Habitat**
Bryoria tortuosa	Semi-open low elevation confer forests, in transition zone from wet coastal to inland
Leptogium burnetiae var. hirsutum	Mesic forests. Mostly on trees and shrubs, also on logs, mosses, and rocks
Leptogium cyanescens[18]	Forests. On bark, rotten logs, and rocks
*Platismatia lacunosa**	Moist riparian forests, commonly on *Alnus*
*Pseudocyphellaria rainierensis**	Hemlock and Douglas-fir old-growth forests, on bark and wood
*Ramalina thrausta**	Low elevation often riparian forests
Bryophytes	
Schistostega pennata	Moist riparian areas in dark places under root wads on soils substrate
Tetraphis geniculata	Old-growth coniferous forests on logs
Vascular Plants	
Botrychium minganense	Mesic coniferous forests, mesic meadows, and roadsides
Cypripedium fasciculatum	Coniferous forest
*Cypripedium montanum**	Coniferous forests
*Eucephalus vialis (Aster vialis)**	Road corridors, forests, edges of meadows and clearcuts

[18] * Indicates that the species has been documented on the Roseburg District.

11 APPENDIX B - WILDLIFE

A. Oregon Department Of Fish And Wildlife Sensitive Species

Table B-1 and the following sensitive species list categories and explanation are those listed by the Oregon Department of Fish and Wildlife in their December 15, 1997 document, "Oregon Department of Fish and Wildlife Sensitive Species":

Critical (C) - "Species for which listing as threatened or endangered is pending, or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throughout their range and some disjunct populations."

Vulnerable (V) - "Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases, populations are sustainable and protective measures are being implemented; in others, populations may be declining and improved protective measures are needed to maintain sustainable populations over time."

Undetermined Status (U) - "Species for which status is unclear. They may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status but scientific study would be needed before a judgment can be made."

Note: Endangered or Threatened species status mentioned in the above definitions is relevant only to State designation as state endangered or threatened, not federal.

Table B-1

Common Name	Scientific Name	ODFW Status
Common Kingsnake	*Lampropeltus getulus*	V
California Mountain Kingsnake	*Lampropeltus zonata*	V
Sharptail Snake	*Contia tenuis*	V
Foothill yellow-legged frog	*Rana boylii*	V
Red-legged frog	*Rana aurora*	U
Southern Seep Salamander	*Rhyacotriton variegatus*	V
Western pond turtle	*Clemmys marmorata*	C
Pileated woodpecker	*Dryocopus pileatus*	V
Purple martin	*Progne subis*	C
Northern Goshawk	*Accipiter gentilis*	C
Olive-sided Flycatcher	*Contpous borealis*	V
Fringed myotis	*Myotis thysanodes*	V
Townsends Big-eared bat	*Plecotus townsendii*	C
Silver-haired bat	*Lasionycteris noctivagans*	U
Long-eared myotis	*Myotis evotis*	U
Long-legged myotis	*Myotis volans*	U
Ringtail	*Bassariscus astutus*	U
Western gray squirrel	*Sciurus griseus*	U

B. Migratory Nongame Birds Of Management Concern In The United States

The 1995 LIST: Prepared by: Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C.

Vaux's Swift
Rufous Hummingbird
Red-Breasted Sapsucker
Olive-Sided Flycatcher
Pacific Slope Flycatcher
Peregrine Falcon
Hermit Warbler

C. *Rare, Threatened And Endangered Species Of Oregon: Oregon Natural Heritage Program, March 1998*

Following are Oregon Natural Heritage Program (ORNHP) designations for species maintained on the ORNHP databases that occur or are expected to occur on the NBHMA. State and Federal Status has not been repeated for species on the following list.

Species	TNC Rank	TNC list
Rana aurora aurora Northern Red-legged frog	G4T4 S3S4	3
Rana boylii foothill yellow-legged frog	G3 S3?	3
Aneides ferreus Clouded salamander	S4	3
Clemmys marmorata marmorata Northwestern pond turtle	G3T3 S2	2
Contia tenuis Sharptail snake	G5 S3	4
Lampropeltus getulus Common kingsnake	G5 S2	3
Dryocopus pileatus Pileated woodpecker	G5 S4?	4
Haliaeetus leucocephalus Bald eagle	G4 S3B, S4N	1
Progne subis Purple martin	G5 S3B	3
Sialia mexicana Western bluebird	G5 S4B, S4N	4

Definitions of rankings and list status are as follows:

TNC - Natural Heritage Network Ranks

The ranking system used by the ORNHP in the prior lists is as follow: The top line is the global rank and begins with a "G". The number relates to the relative abundance of the species based on known occurrences as listed: On the second line, the "S" denotes the state designation.

1= Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.

2=Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction or extirpation, typically with 6-20 occurrences.

3=Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences.

4=Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.

5=Demonstrably widespread, abundant, and secure.

?=Not yet ranked, or assigned rank is uncertain.

Listing categories:

List 1 contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.
List 2 contains taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon.
List 3 contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.
List 4 contains taxa which are of conservation concern but are not currently threatened or endangered. While these taxa currently may not need the same active management attention as threatened or endangered taxa, they do require continued monitoring.

D. USDI Bureau Of Land Management, Special Status Species

BLM Oregon & Washington, January 19, 2000

The following list is of species that the BLM considers sensitive and has assigned to one of three categories and may occur or have been documented in the analysis area.

Bureau sensitive (BS) designation includes species that could easily become endangered or extinct in a state. They are restricted in range and have natural or human-caused threats to survival. Bureau Sensitive species are not federally or state listed but are eligible for federal or state listing or candidate status. Thus species that are Oregon State critical or ORNHP List 1 are considered Bureau Sensitive species.

Bureau Sensitive species are designated by the State Director and are typically tiered to the state wildlife agencies' designations. Bureau manual 6840 policy requires that any Bureau action will not contribute to the need to list any of these species (i.e., equivalent to policy applied to federal candidate species).

All species on the following list are classified as category D species in the Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures, Standards and Guidelines, January 2001.

Species listed as category D species are, under the ROD; "(uncommon, Pre-disturbance Surveys Not Practical or Not Necessary)" These are species in which concern for their persistence is not high "because inadvertent loss of some undiscovered sites would not change level of rarity".

Bureau assessment (BA) species are "plant and animal species which are not presently eligible for official federal or state status but are of concern in Oregon or Washington and may, at a minimum, need protection or mitigation in BLM activities. These species will be considered as a level of special status species separate from Bureau sensitive, and are referred to as bureau assessment species."

Bureau Tracking (BT) are those species listed "to enable an early warning for species which may become threatened or endangered in the future. Districts are encouraged to collect occurrence data on species for which more information is needed to determine status within the state or which no longer need active management. Until status of such species changes to federal or state listed, candidate or assessment species, 'tracking species' will not be considered as special status species for management purposes."

Species listed are by common name. Refer to species lists for proper names if required.

Bureau Sensitive Species (BS):

Common Name	BLM Status	ROD Category
Purple Martin	Sensitive	D
Western Pond Turtle	Sensitive	D
Oregon Megomphix (Snail)	Sensitive	D
Townsends Big-Eared bat	Sensitive	D
Northern Goshawk	Sensitive	D
Peregrine Falcon	Sensitive	D

Bureau Assessment Species (BA):

Common Name	BLM Status	ROD Category
Blue-grey tail-dropper (slug)	Assessment	D
Papillose tail-dropper (slug)	Assessment	D

Bureau Tracking Species (BT):

Common Name	BLM Status	ROD Category
Clouded Salamander	Tracking	D
Foothill Yellow-legged Frog	Tracking	D
Pileated Woodpecker	Tracking	D
California Mountain Kingsnake	Tracking	D
Common Kingsnake	Tracking	D
Sharp-tailed Snake	Tracking	D
Southern Torrent (Seep) Salamander	Tracking	D
Northern Red-legged Frog	Tracking	D
Western Gray Squirrel	Tracking	D
Fringed Myotis (Bat)	Tracking	D
Long-legged Myotis (Bat)	Tracking	D
Long-eared Myotis (Bat)	Tracking	D
Yuma Myotis (Bat)	Tracking	D
Silver-haired Bat	Tracking	D
Olive-sided Flycatcher	Tracking	D

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